

Appendix D

Earthquake source parameters for southern California tomography

Note

This appendix is devoted to explaining the details of the 294 earthquakes listed in Figures D.1–D.37. Details regarding the selection of sources are discussed in Chapter 6.

Description of Figures D.1–D.37

We have two objectives in assembling focal mechanisms from previously studied earthquakes:

1. to obtain the best possible source parameters for our SEM-based source inversions or for our tomographic inversion;
2. to test the differences among various source-inversion approaches (Section 6.2.2) by comparing 3D synthetics directly with data.

Figures D.1–D.37 is a compilation of focal mechanisms for 294 earthquakes in southern California. The earthquakes are sorted by region, and, within each region, by origin time. Many of the earthquakes occur in aftershock sequences, so this ordering allows one to readily identify differences within the same sequence.

Each of the 294 earthquakes is classified into one of the six groups in Table D.1. The majority of the “extra” and “outside” sources are primarily from a set of 159 well-studied

Table D.1: Classification groups for all 294 earthquakes in Figures D.1–D.37.

label	number	description
TOMO	143	used in at least one iteration of the tomographic inversion
EXTRA	91	not used in the tomographic inversion
LOW SNR	28	low signal-to-noise ratio
OUTSIDE	16	outside simulation region
REJECTED	9	rejected
BAD SOURCE	7	wrong source mechanism

earthquakes of *Tan* (2006, Appendix A).

The “low SNR” earthquakes are primarily events that generate synthetic seismograms that have measurement windows (*Maggi et al.*, 2009) at fewer than 10 stations. In regions that are very challenging to determine source parameters—for example, Continental Borderlands and Salton trough—I have moved some low signal-to-noise earthquakes in the “extra” group, if the comparison with data suggested that the focal mechanism was “in the ballpark”. I have left the “low SNR” earthquakes in the compilation for completeness, but most of these earthquakes are not quality events and are probably not worth investigating any further.

The “rejected” earthquakes are primarily events that occurred close in space, time, and magnitude to other events. These were typically determined by analyzing near-source records and identifying coherent seismic energy later in the same seismograms. Each secondary event was confirmed using the Southern California Earthquake Data Center catalog. I also rejected earthquakes that were clearly too large for a point-source approximation, given our period range of interest (2–30 s), such as the 2004.09.28 M_w 6.2 Parkfield earthquake (14094992).

The “bad source” earthquakes are events that appear to have data with high enough signal-to-noise ratio, but that clearly have the wrong source parameters. It is possible that better mechanisms could be determined with additional source inversion attempts, such as *Liu et al.* (2004).

Figures D.1–D.37 contains eight columns, which are described in Table D.2.

The “CAP” mechanisms are primarily from the set of 159 in *Tan* (2006), with 20 additional mechanisms provided by Shengji Wei (Caltech, December 2008). These 20 events are: 10006857, 10148421, 11671240, 12659440, 14073800, 14077668, 14138080, 14178236,

Table D.2: Eight columns of Figures D.1–D.37

column	label	description	reference
1	CAP	cut-and-paste method	<i>Tan</i> (2006)
2	JH	P/S amplitude ratio method	<i>Hardebeck and Shearer</i> (2003)
3	SCEDC	SCEDC	<i>Clinton et al.</i> (2006)
4	mod	SCEDC-modified	<i>Clinton et al.</i> (2006)
5	SEMm00	SEM inversion using \mathbf{m}_{00}	<i>Liu et al.</i> (2004)
6	m12	source parameters for \mathbf{m}_{12}	
7	SEMm12	SEM inversion using \mathbf{m}_{12}	<i>Liu et al.</i> (2004)
8	m16	source parameters for \mathbf{m}_{16}	

14179288, 14179292, 14186612, 14239184, 3320736, 9111353, 9112735, 9117942, 9154092, 9967901, 14383980, and 14408052.

The “mod” mechanisms only differ from “SCEDC” in cases where Egill Hauksson tried the inversion of *Clinton et al.* (2006) using different stations. These were cases where I identified poor agreement between data and 3D synthetics generated using the SCEDC mechanism. These events include: 10230869, 13970876, 13966672, 14072464, 9944301, 14179288, 14179292, 14263712, 9753485, 9755013, and 14178236.

The “SEMm00” inversions required an initial-guess focal mechanisms, which was taken to be the SCEDC mechanism in all cases except for 14263712, which used the modified SCEDC mechanism (“mod”).

For the labels at the right, the numbers N1, N2, and N3 in “m16 : N1 (N2, N3, N4)” are given by:

-
- | | |
|----|---|
| N1 | total number of stations with measurements for model \mathbf{m}_{16} |
| N2 | number of stations with measurements for periods 6–30 s for \mathbf{m}_{16} |
| N3 | number of stations with measurements for periods 3–30 s for \mathbf{m}_{16} |
| N4 | number of stations with measurements for periods 2–30 s for \mathbf{m}_{16} |
-

The label for each earthquake at the left of each row contains the event ID with a tag denoting two items: (1) the dataset providing the hypocenter and origin time; (2) the dataset providing the focal mechanism. The datasets for the hypocenters and origin times are:

label	reference
Salton	<i>Lohman and McGuire</i> (2007)
Parkfield	<i>Thurber et al.</i> (2006)
SanSimeon	<i>McLaren et al.</i> (2008), courtesy of Jeanne Hardebeck
Lin	<i>Lin et al.</i> (2007a), plus 18 from Guoqing Lin
NCEDC	NCEDC catalog
SCEDC-Loc	SCEDC local catalog
SCEDC-Reg	SCEDC regional catalog

The data sources for the focal mechanisms are:

label	reference
SEMm00	SEM inversion with model \mathbf{m}_{00} (unpublished)
CAP	<i>Tan</i> (2006), plus 20 by Shengji Wei
JH	<i>Hardebeck and Shearer</i> (2003)
SCEDCmod	SCEDC with Hauksson modifications, if available
SEMm12	SEM inversion with model \mathbf{m}_{00} (unpublished)
CHT	Carl's replacement after synthetic tests (unpublished)

For example, the label 9718013_SEMm12_Lin denotes event 9718013, focal mechanism and modified depth from the SEM inversion using \mathbf{m}_{12} , and origin time, epicenter, and initial depth from *Lin et al.* (2007a).

The eight “CHT” events (10061489, 9119414, 14139160, 9154233, 9722669, 9817605, 13966672, 9660449) are events that initially generated poor fits to the data, but which had other proximal events (in time, space, and magnitude) with *different* mechanisms that produced much better fits. In these cases, I assigned the “other” event’s focal mechanism to the CHT event, then generated 3D synthetics to verify that the new mechanism was better. One dramatic example of improvement is for 9817605, an event in the Salton trough. Mechanisms from CAP and SCEDC are similar and, based on the 3D synthetics fits to data, are clearly not correct. I assigned the focal mechanism of 9722633, a well-fit earthquake that occurred in the same region less than one year earlier. Using the new mechanism for 9817605, I produced 3D synthetics with measurements at 112 stations, indicating a very well-recorded earthquake. None of the CHT events were used in the tomographic inversion, and they await SEM-based inversion (*Liu et al.*, 2004) using the final model (\mathbf{m}_{16}).

Additional labels are associated with the focal mechanisms in each column:

- For the CAP focal mechanisms, we list the depth and also the magnitude.
- For the JH focal mechanism, “A: P29, R4” would denote quality A, 29 P-wave polarities used, and 4 S/P amplitude ratios used.
- For the SCEDC focal mechanisms, the variance reduction is listed. The variance reduction determines the “quality factor” as follows:

VR interval	quality factor
$VR > 60$	A : “Mw, MT good enough for distribution”
$40 < VR < 60$	B : “Mw only good enough for distribution”
$VR < 40$	C : “Solution needs review before distribution”

- For the SEMm00 focal mechanisms, we list the percent non-double couple, which can range from 0 to 100.
- For the SEMm12 focal mechanisms, we list the depth and also the magnitude.

294 events in southern California (1 to 8)

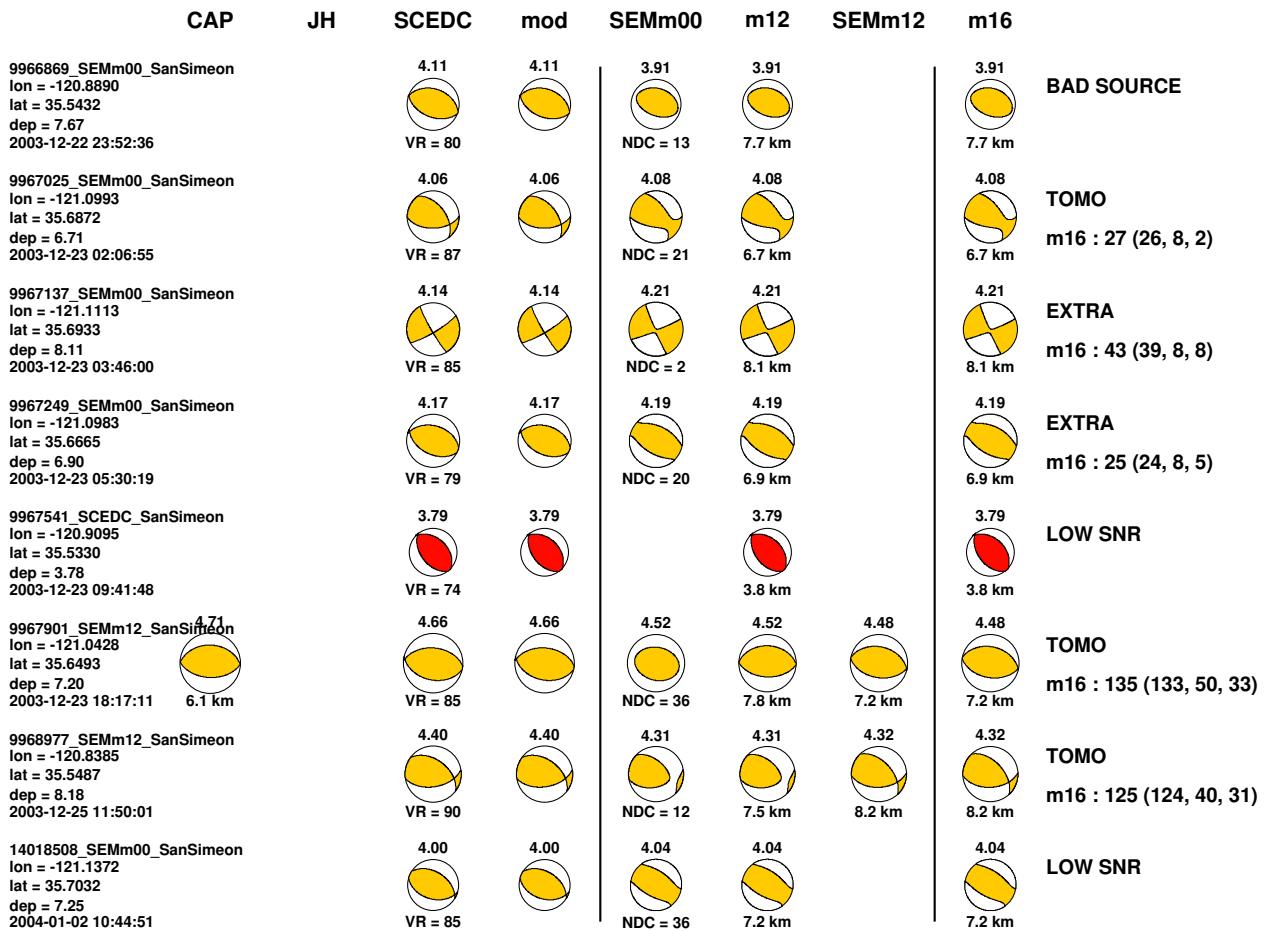
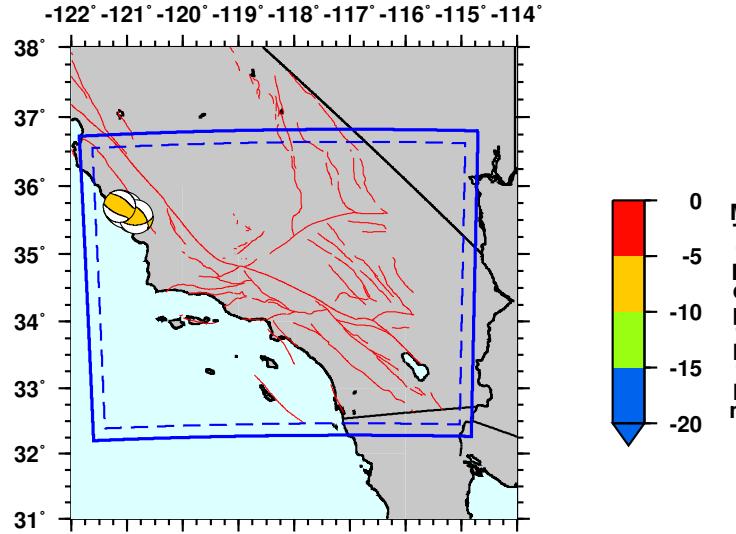
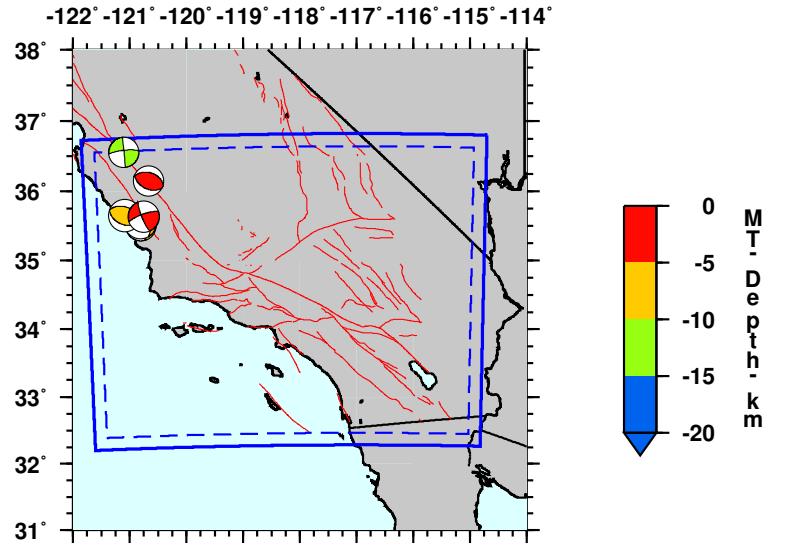


Figure D.1: Source mechanisms considered in the southern California tomography study (1 through 8 out of 294).

294 events in southern California (9 to 16)



CAP	JH	SCEDC	mod	SEMm00	m12	SEMm12	m16	
9982749_SCEDC_SanSimeon lon = -120.8740 lat = 35.5918 dep = 5.48 2004-02-12 09:27:46		3.62 VR = 45	3.62		3.62 5.5 km		3.62 5.5 km	BAD SOURCE
9983625_SCEDC_SanSimeon lon = -120.8693 lat = 35.5800 dep = 5.76 2004-02-15 02:52:22		3.54 VR = 44	3.54		3.54 5.8 km		3.54 5.8 km	LOW SNR
10005209_SEMm00_SanSimeon lon = -120.8028 lat = 35.5067 dep = 7.03 2004-05-02 13:22:00		3.70 VR = 50	3.70	3.74 NDC = 7	3.74 7.0 km		3.74 7.0 km	LOW SNR
14096736_SEMm12_SanSimeon lon = -120.8108 lat = 35.5473 dep = 6.87 2004-10-02 12:22:08		4.05 VR = 87	4.05	4.03 NDC = 18	4.03 6.7 km	3.98 6.9 km	3.98 6.9 km	TOMO m16 : 93 (93, 17, 16)
14189556_SEMm12_SanSimeon lon = -121.0838 lat = 35.6500 dep = 5.16 2005-10-02 13:48:09		4.05 VR = 80	4.05	4.03 NDC = 66	4.03 5.5 km	4.02 5.2 km	4.02 5.2 km	TOMO m16 : 28 (21, 13, 8)
14263252_SCEDC_SCEDC-Loc lon = -120.7510 lat = 35.6360 dep = 4.20 2006-11-28 04:06:40		3.81 VR = 68	3.81		3.81 4.2 km		3.81 4.2 km	EXTRA m16 : 14 (14, 0, 2)
13965956_SCEDC_NCEDC lon = -121.1007 lat = 36.5565 dep = 10.42 2003-05-22 23:48:52		3.67 VR = 46	3.67		3.67 10.4 km		3.67 10.4 km	LOW SNR
14094528_SCEDC_Parkfield lon = -120.6661 lat = 36.1434 dep = 4.48 2004-09-26 15:54:06		3.75 VR = 73	3.75		3.75 4.5 km		3.75 4.5 km	LOW SNR

Figure D.2: Source mechanisms considered in the southern California tomography study (9 through 16 out of 294).

294 events in southern California (17 to 24)

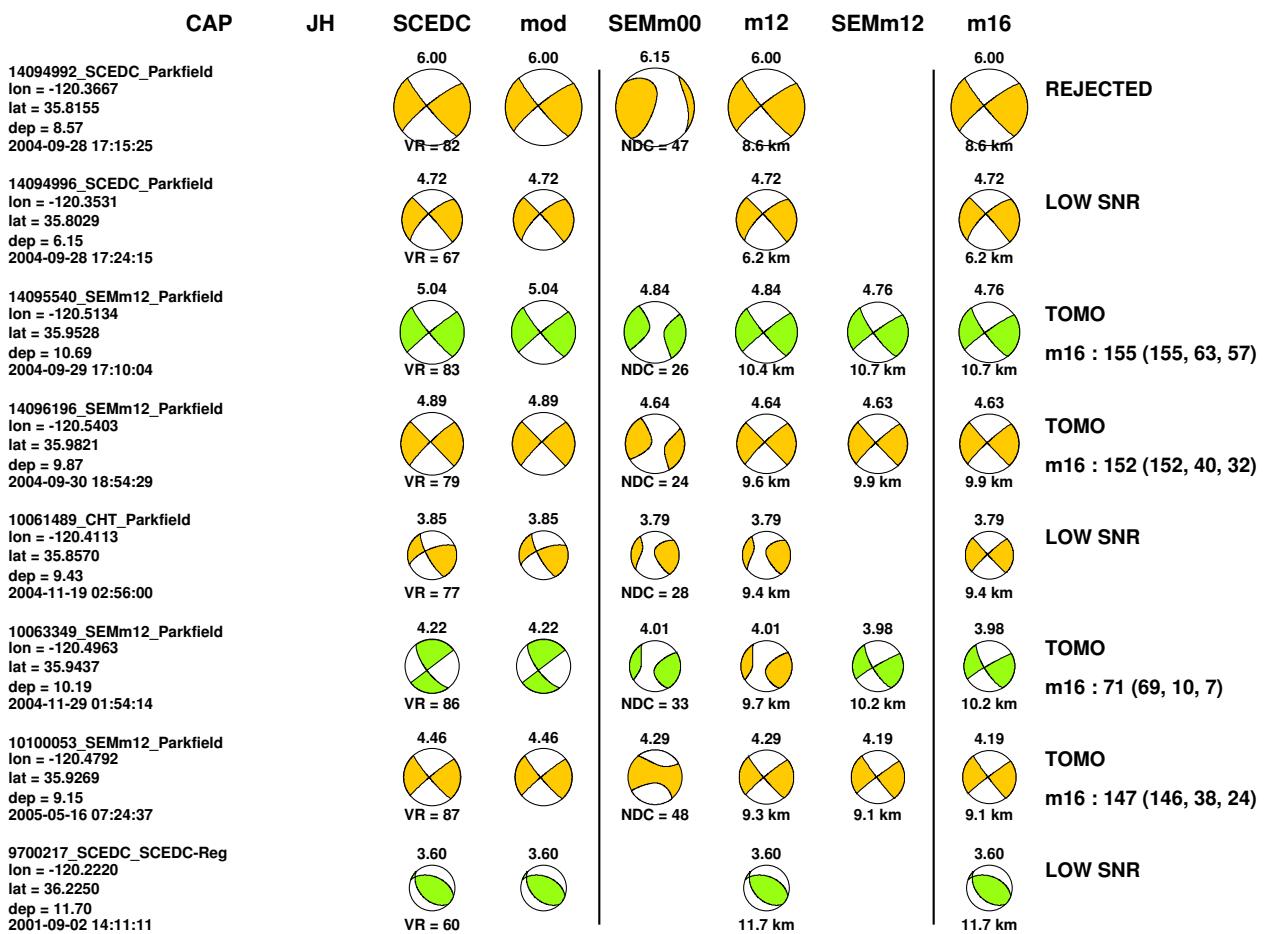
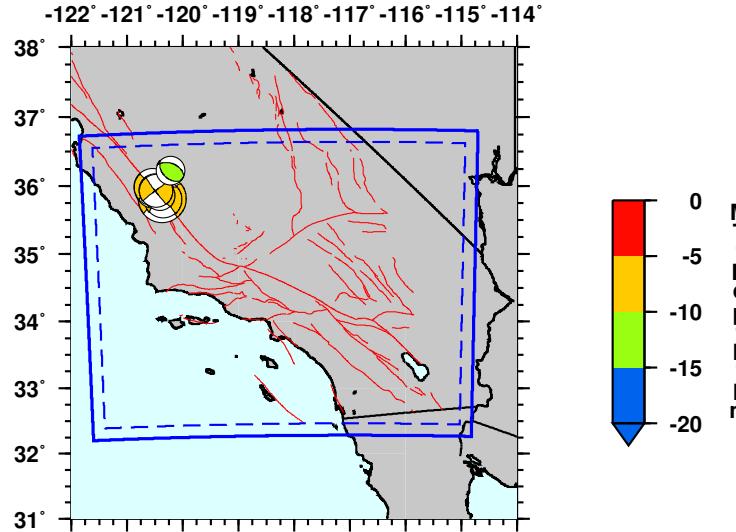
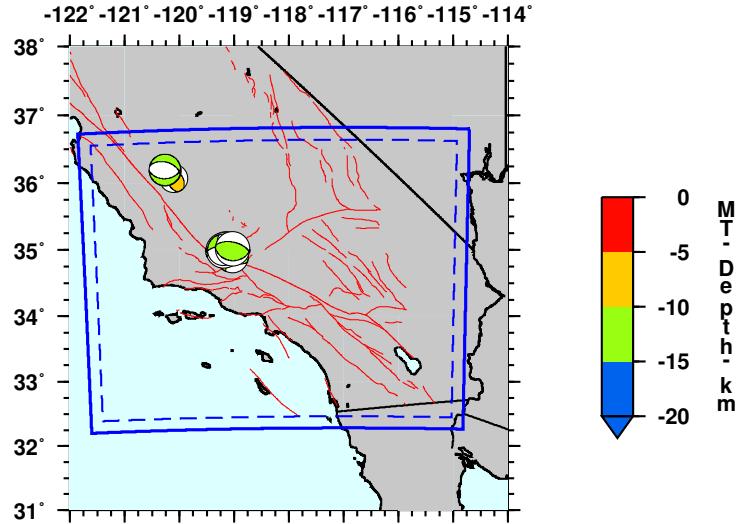


Figure D.3: Source mechanisms considered in the southern California tomography study (17 through 24 out of 294).

294 events in southern California (25 to 32)



CAP	JH	SCEDC	mod	SEMm00	m12	SEMm12	m16	
14155056_SECDC_SECDC-Reg lon = -120.1020 lat = 36.0720 dep = 6.00 2005-06-16 11:37:52		3.59 VR = 58	3.59		3.59 6.0 km		3.59 6.0 km	LOW SNR
10222697_SECDC_SECDC-Reg lon = -120.2430 lat = 36.1860 dep = 5.20 2006-12-15 19:21:56		3.80 VR = 51	3.80		3.80 5.2 km		3.80 5.2 km	LOW SNR
10222753_SECDC_SECDC-Reg lon = -120.2640 lat = 36.1950 dep = 14.60 2006-12-16 06:14:06		4.01 VR = 61	4.01		4.01 14.6 km		4.01 14.6 km	BAD SOURCE
9171679_SEMm12_Lin lon = -119.0298 lat = 34.8942 dep = 14.27 2000-12-24 01:04:21	4.10 B: P73, R10 17.1 km	4.01 VR = 82	4.20 VR = 82	4.20	4.05 NDC = 29 14.8 km	4.10 14.3 km	4.01 14.3 km	TOMO m16 : 36 (28, 22, 16)
9983429_SEMm12_Lin lon = -119.1412 lat = 35.0118 dep = 11.81 2004-02-14 12:43:11	4.50 12.9 km	4.53 VR = 85	4.53		4.57 NDC = 9 13.5 km	4.57 11.8 km	4.48 11.8 km	TOMO m16 : 156 (154, 140, 134)
14138080_SEMm12_Lin lon = -119.1940 lat = 34.9987 dep = 10.16 2005-04-16 19:18:13	4.71 11.6 km	4.59 VR = 75	4.59		4.61 NDC = 17 10.5 km	4.61 10.2 km	4.56 10.2 km	TOMO m16 : 160 (160, 143, 135)
10097009_SEMm12_Lin lon = -119.1958 lat = 35.0023 dep = 13.01 2005-05-06 02:29:09		4.25 VR = 85	4.25		4.09 NDC = 25 13.4 km	4.09 13.0 km	4.03 13.0 km	TOMO m16 : 152 (152, 108, 107)
14186612_SEMm12_Lin lon = -119.0247 lat = 35.0178 dep = 10.24 2005-09-22 20:24:48	4.57 10.6 km B: P61, RNaN	4.42 VR = 81	4.69 VR = 81	4.69	4.60 NDC = 5 10.2 km	4.60 10.2 km	4.42 10.2 km	TOMO m16 : 159 (159, 138, 133)

Figure D.4: Source mechanisms considered in the southern California tomography study (25 through 32 out of 294).

294 events in southern California (33 to 40)

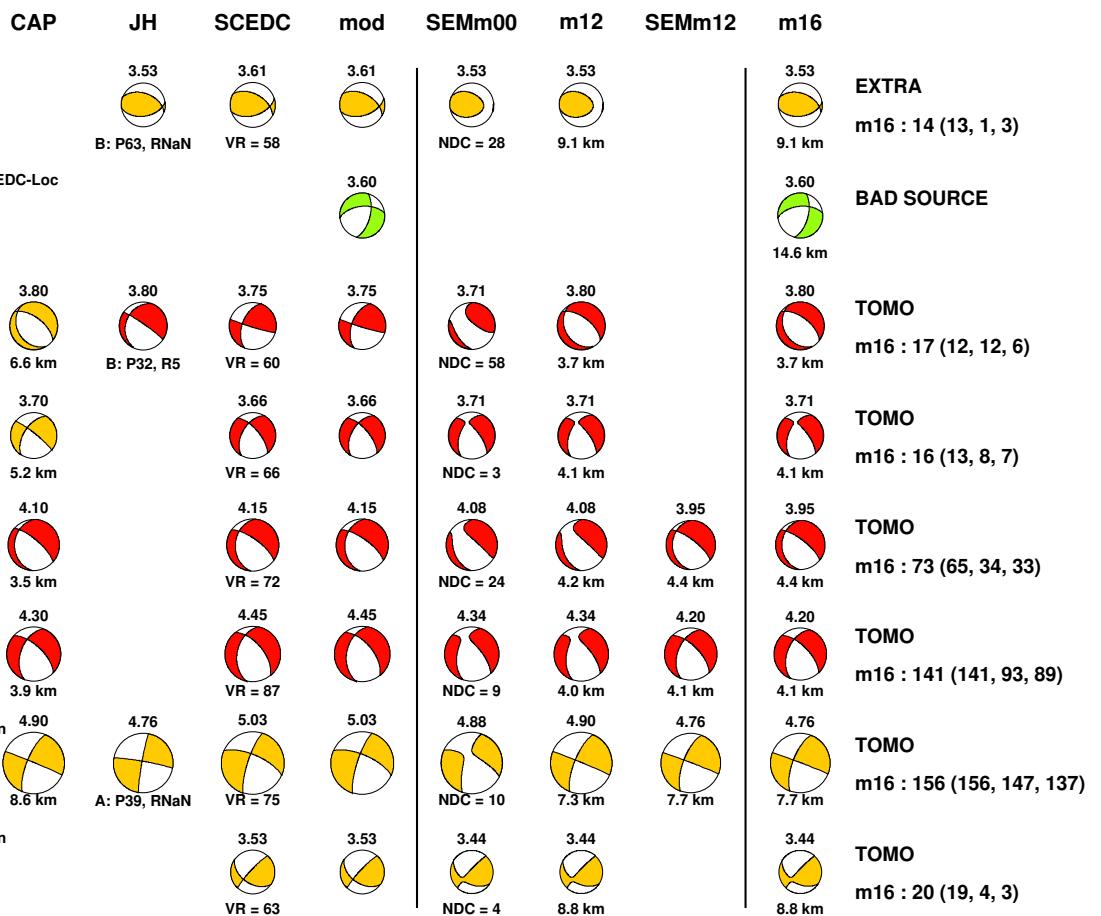
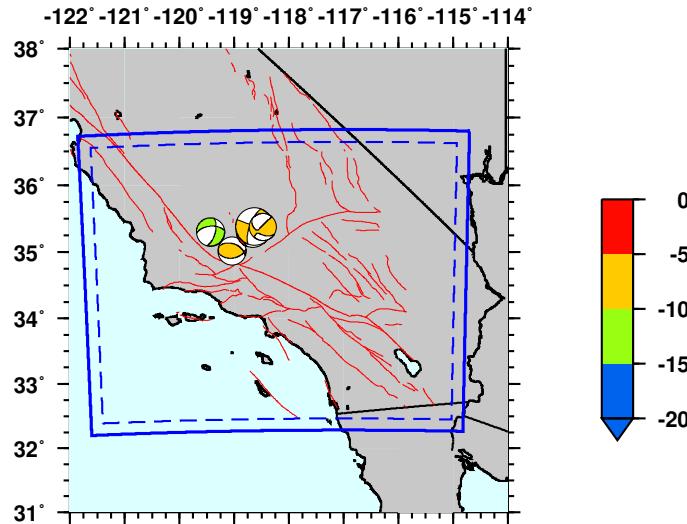


Figure D.5: Source mechanisms considered in the southern California tomography study (33 through 40 out of 294).

294 events in southern California (41 to 48)

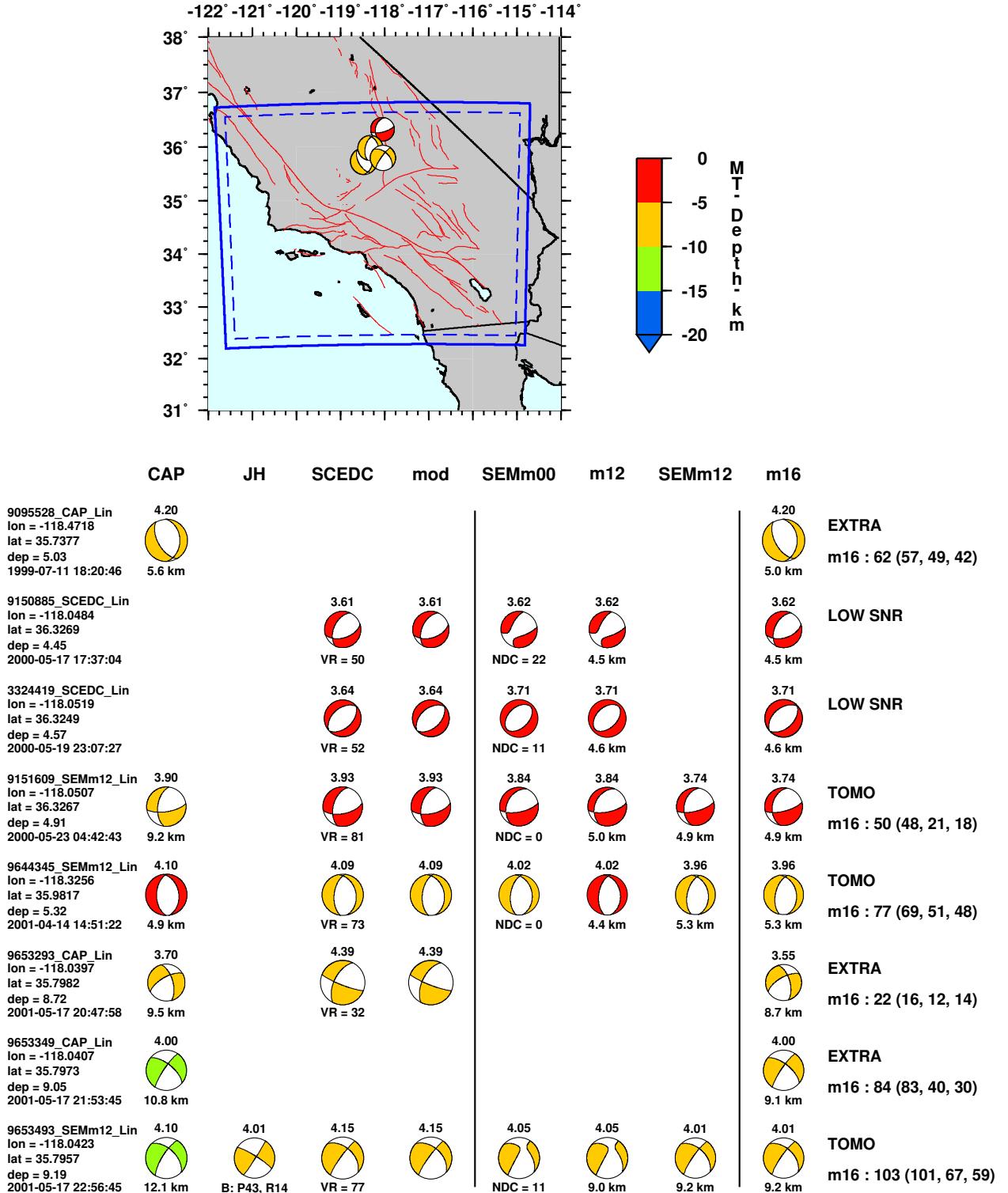


Figure D.6: Source mechanisms considered in the southern California tomography study (41 through 48 out of 294).

294 events in southern California (49 to 56)

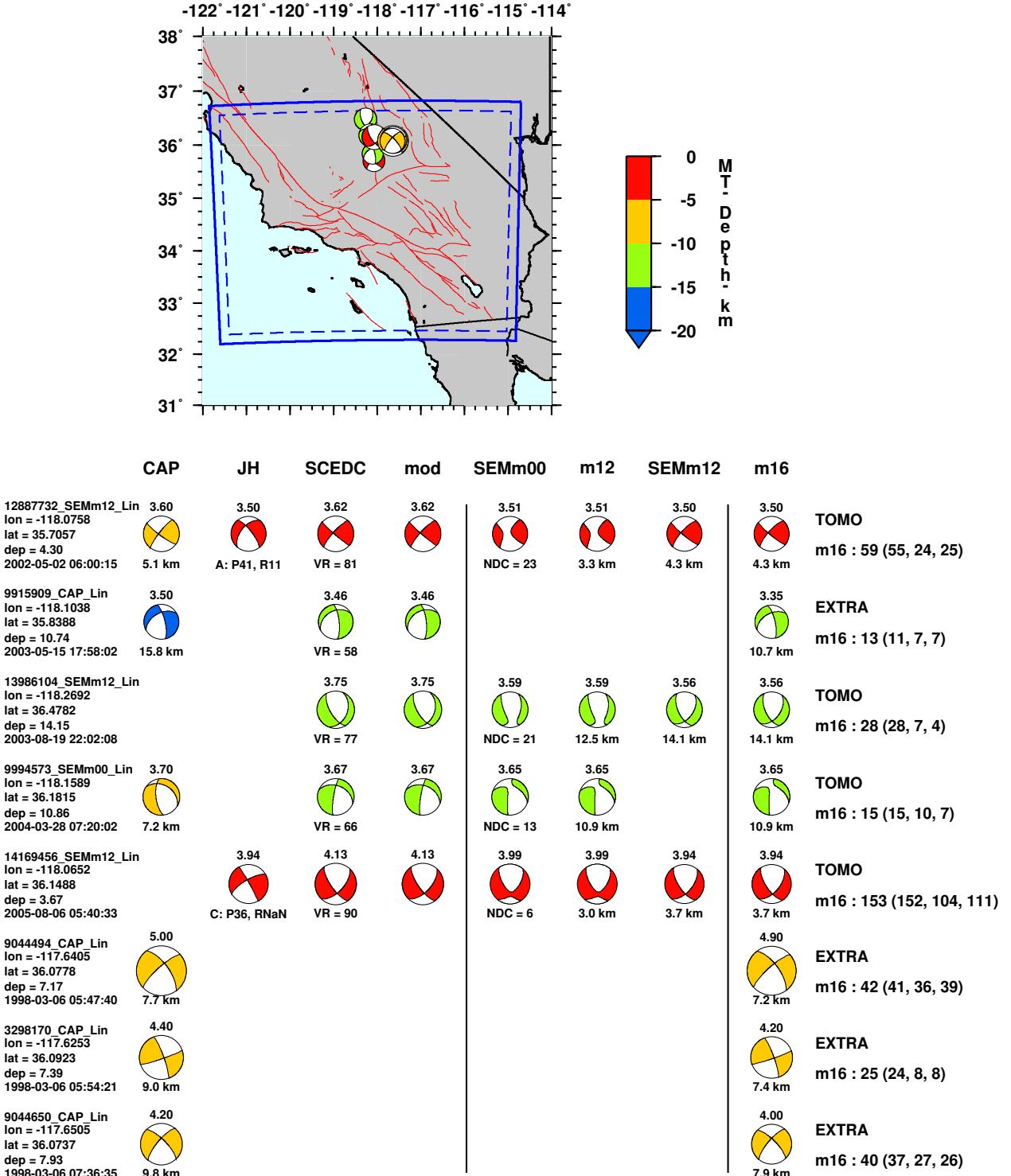


Figure D.7: Source mechanisms considered in the southern California tomography study (49 through 56 out of 294).

294 events in southern California (57 to 64)

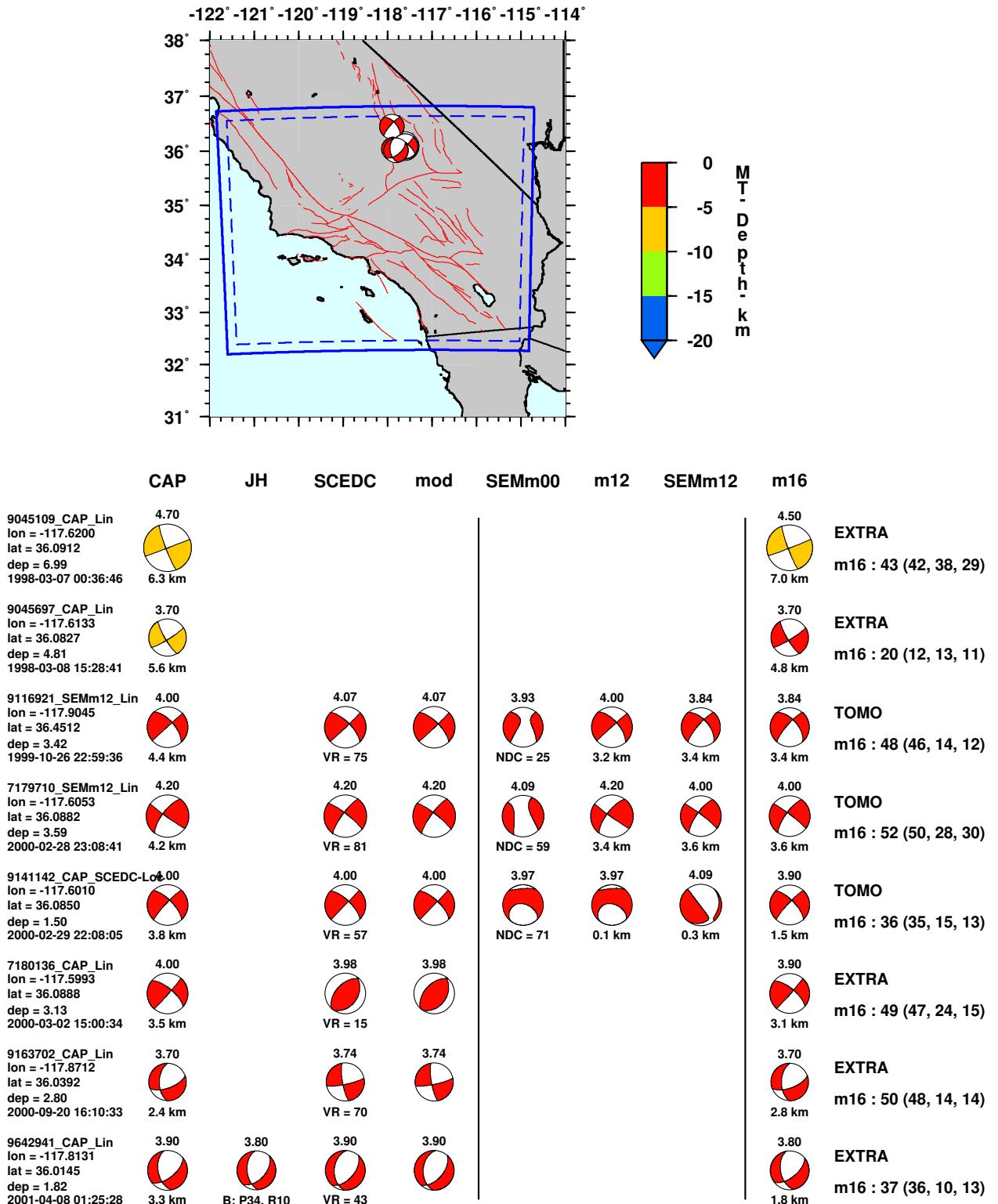


Figure D.8: Source mechanisms considered in the southern California tomography study (57 through 64 out of 294).

294 events in southern California (65 to 72)

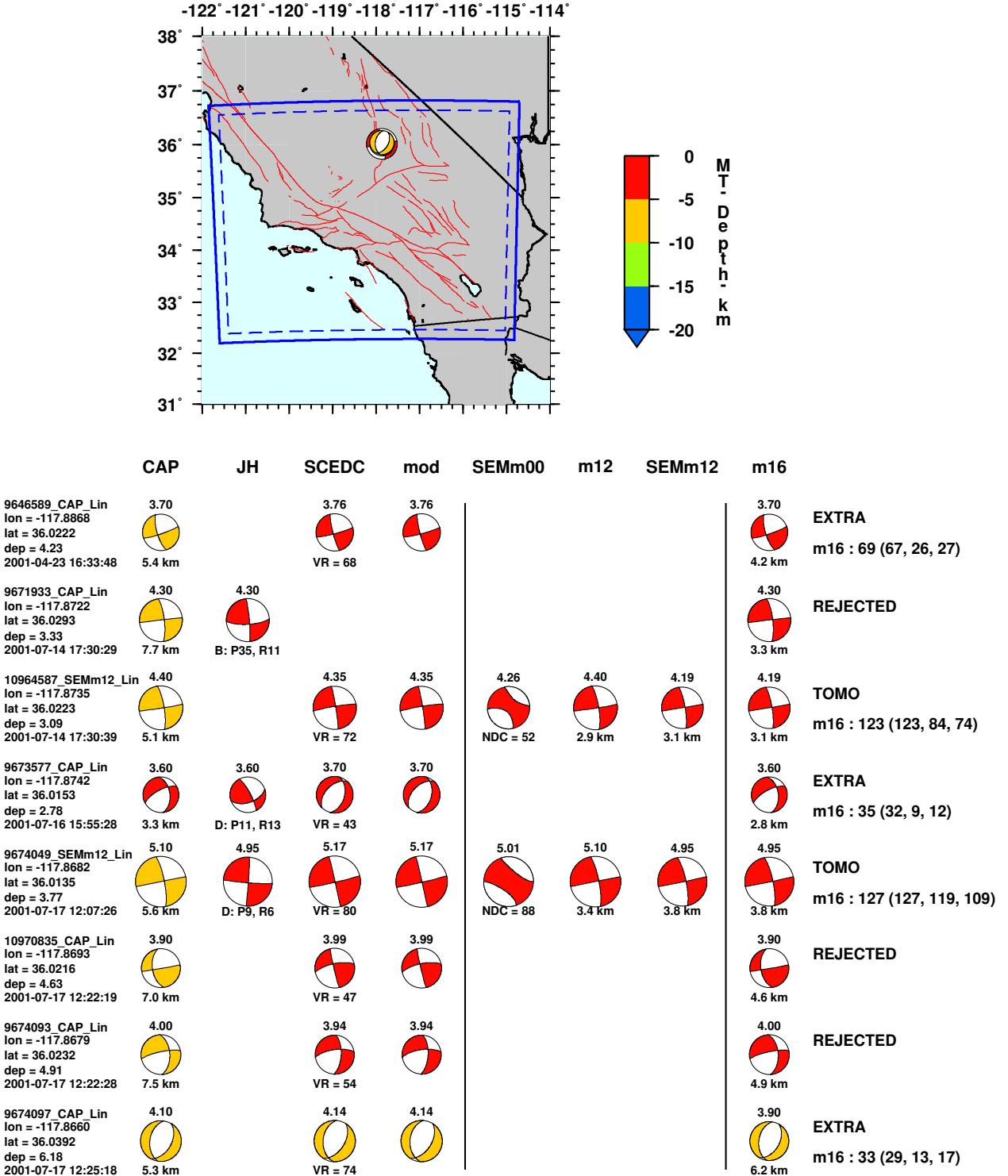


Figure D.9: Source mechanisms considered in the southern California tomography study (65 through 72 out of 294).

294 events in southern California (73 to 80)

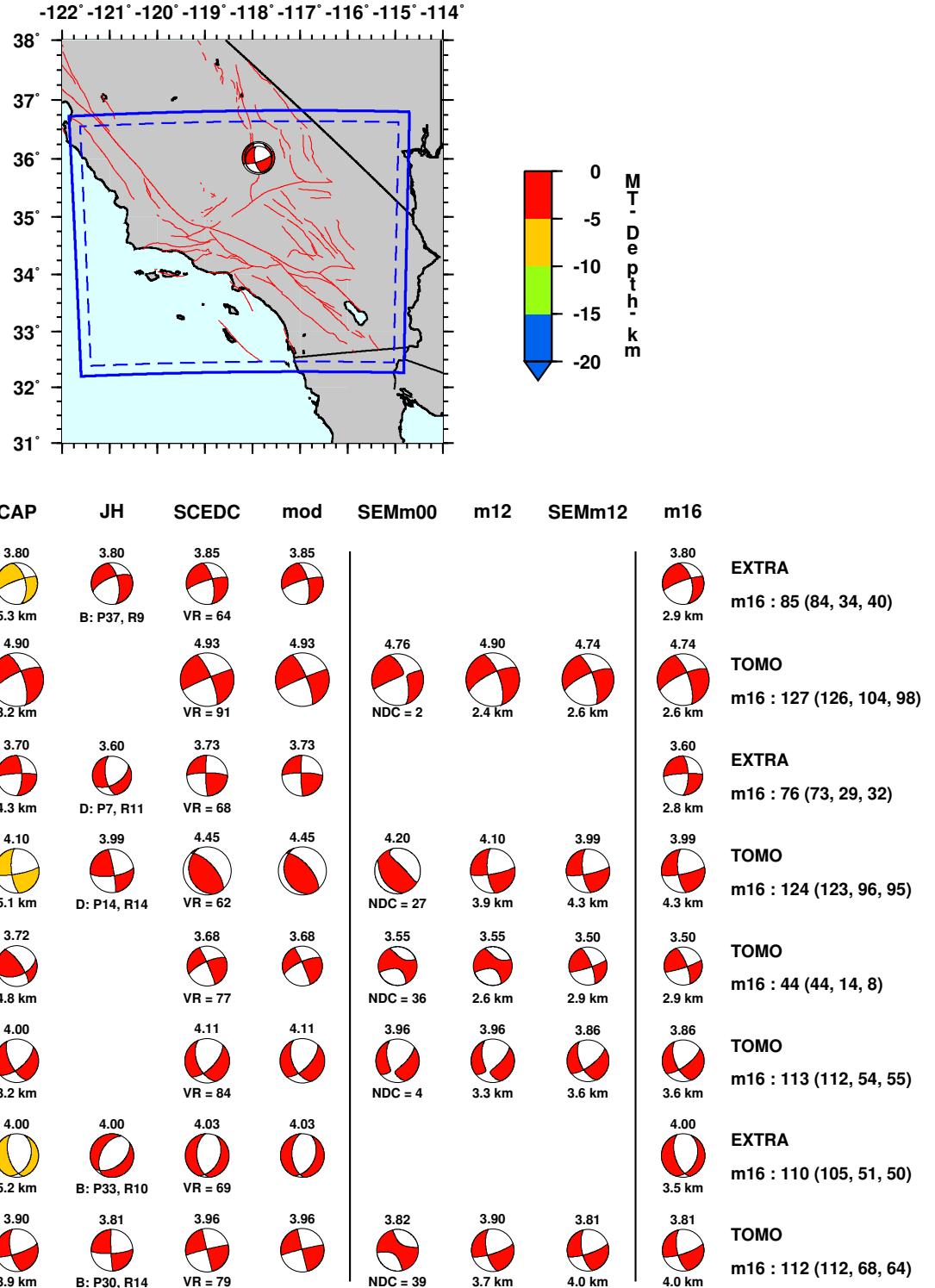


Figure D.10: Source mechanisms considered in the southern California tomography study (73 through 80 out of 294).

294 events in southern California (81 to 88)

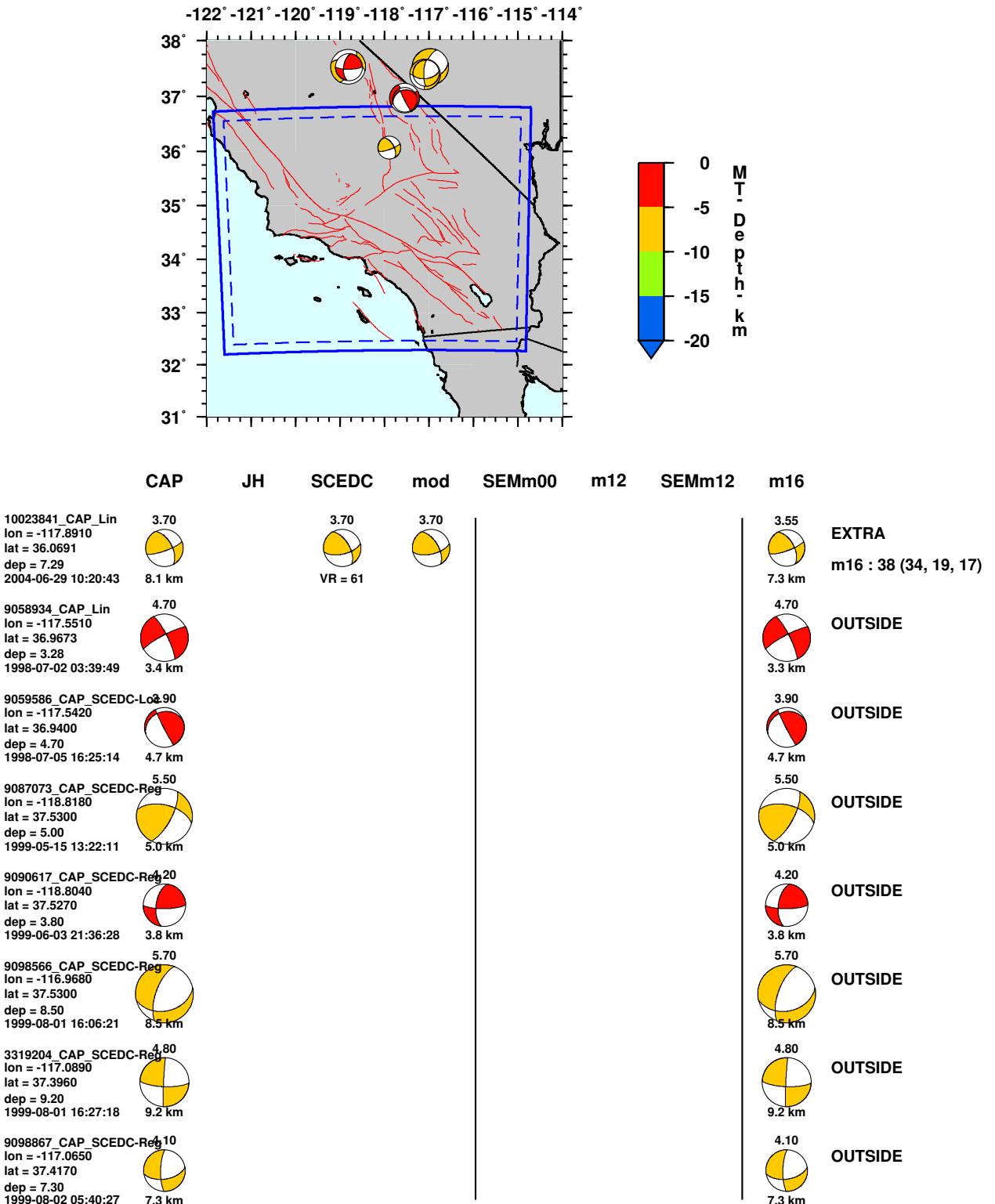


Figure D.11: Source mechanisms considered in the southern California tomography study (81 through 88 out of 294).

294 events in southern California (89 to 96)

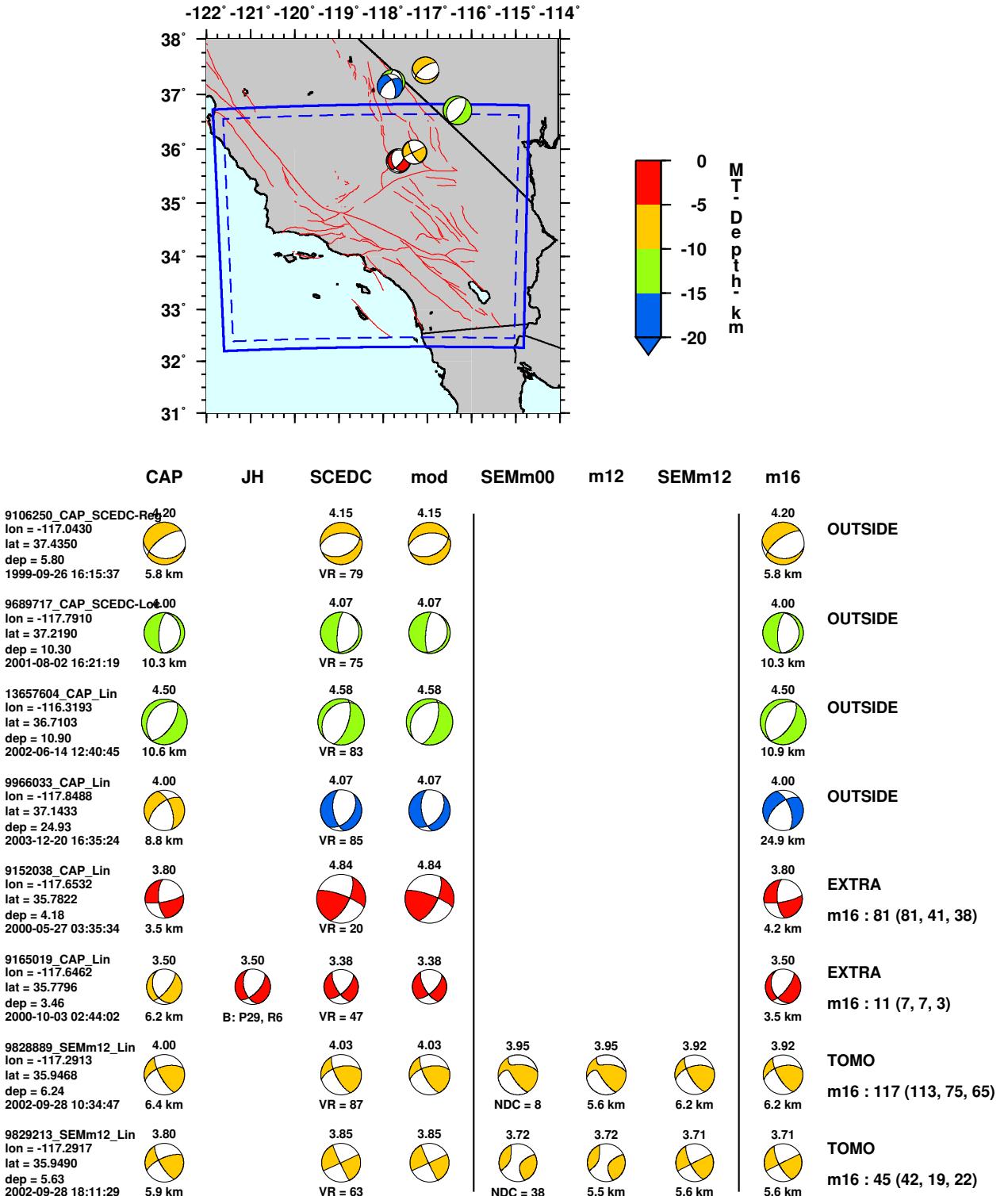
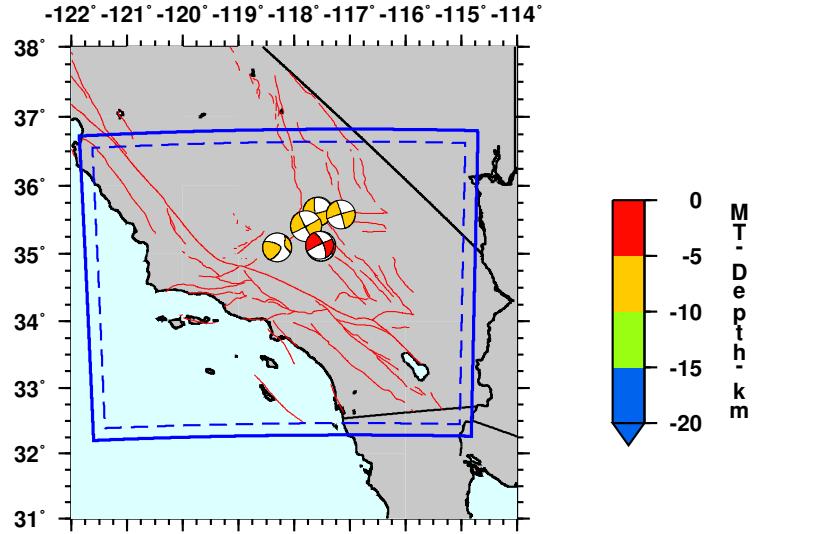


Figure D.12: Source mechanisms considered in the southern California tomography study (89 through 96 out of 294).

294 events in southern California (97 to 104)



CAP	JH	SCEDC	mod	SEMm00	m12	SEMm12	m16
14007388_SEMm12_Lin lon = -117.5664 lat = 35.6352 dep = 2.13 2003-12-04 06:15:52	3.48 B: P31, R5	3.57 VR = 75	3.57	3.52 NDC = 14	3.52 2.3 km	3.48 2.1 km	3.48 TOMO m16 : 32 (28, 11, 11) 2.1 km
14219360_SEMm12_Lin lon = -117.5828 lat = 35.6232 dep = 8.98 2006-03-29 01:36:22	3.60 B: P41, RNaN	3.71 VR = 73	3.71	3.66 NDC = 16	3.66 8.6 km	3.60 9.0 km	3.60 TOMO m16 : 24 (22, 9, 13) 9.0 km
9094270_CAP_Lin lon = -118.3055 lat = 35.0944 dep = 7.71 1999-07-01 12:43:07	3.60 9.0 km						3.60 EXTRA m16 : 41 (39, 23, 22) 7.7 km
9151000_SEMm00_Lin lon = -118.3073 lat = 35.0942 dep = 7.49 2000-05-18 09:41:37	3.70 7.5 km	3.62 VR = 72	3.62	3.61 NDC = 10	3.61 7.5 km	3.61 7.5 km	3.61 TOMO m16 : 28 (25, 9, 8) 7.5 km
9171064_SCEDC_Lin lon = -117.1652 lat = 35.5801 dep = 6.13 2000-12-17 02:46:11		3.66 VR = 70	3.66	3.61 NDC = 35	3.61 6.1 km	3.61 6.1 km	3.61 EXTRA m16 : 12 (10, 4, 3) 6.1 km
14418600_SCEDC_SCEDC-Loc lon = -117.7860 lat = 35.4130 dep = 8.50 2009-01-31 21:09:22			3.99				3.89 EXTRA m16 : 127 (124, 87, 68) 8.5 km
9631385_SEMm00_Lin lon = -117.5195 lat = 35.1143 dep = 4.22 2001-02-24 06:09:59		3.73 VR = 69	3.73	3.71 NDC = 23	3.71 4.2 km	3.71 4.2 km	3.71 EXTRA m16 : 15 (11, 4, 4) 4.2 km
14204000_SEMm12_Lin lon = -117.5450 lat = 35.1267 dep = 4.63 2005-12-13 20:35:22	3.49 B: P68, RNaN	3.61 VR = 71	3.61	3.56 NDC = 25	3.56 4.4 km	3.49 4.6 km	3.49 TOMO m16 : 35 (34, 6, 5) 4.6 km

Figure D.13: Source mechanisms considered in the southern California tomography study (97 through 104 out of 294).

294 events in southern California (105 to 112)

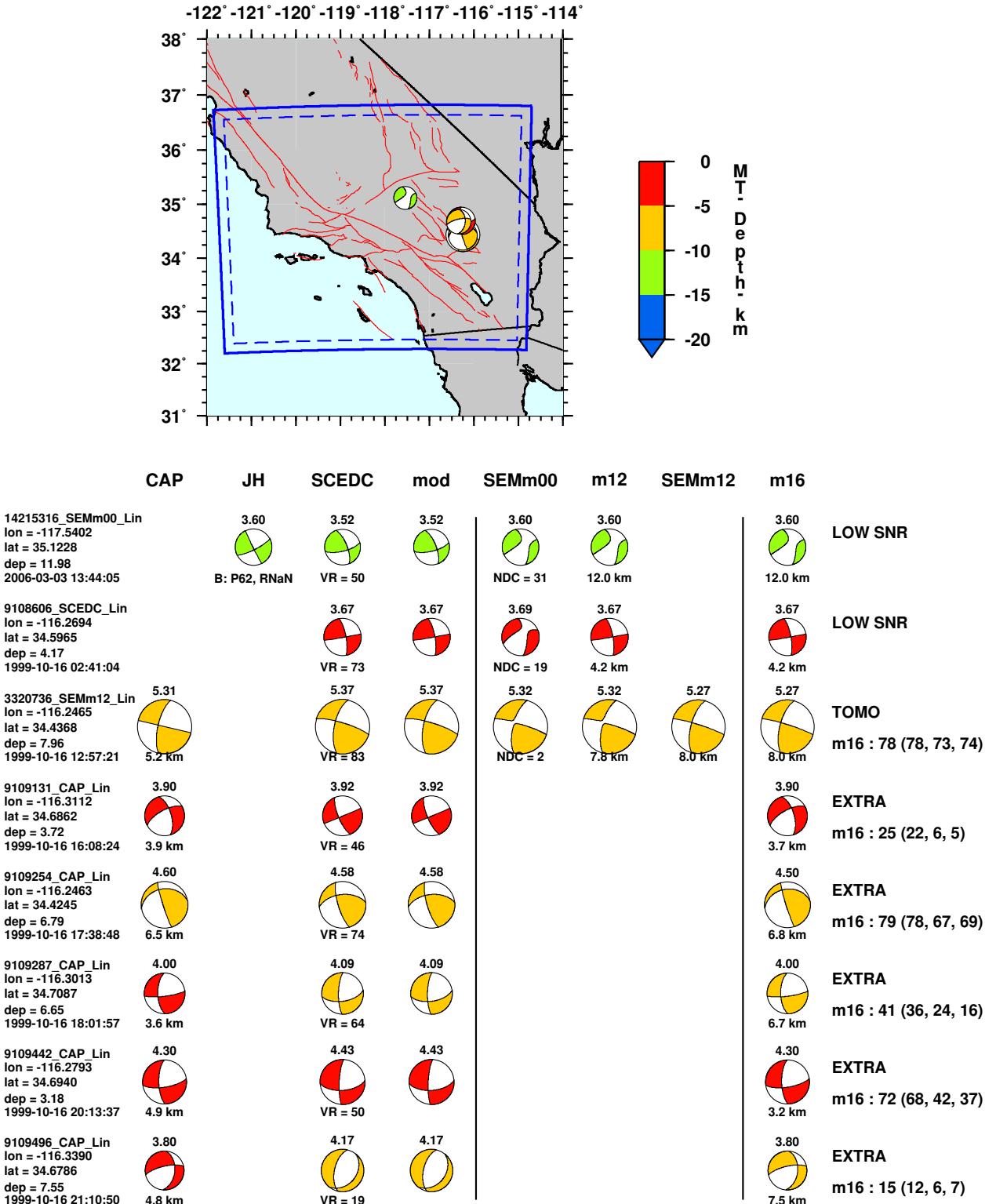


Figure D.14: Source mechanisms considered in the southern California tomography study (105 through 112 out of 294).

294 events in southern California (113 to 120)

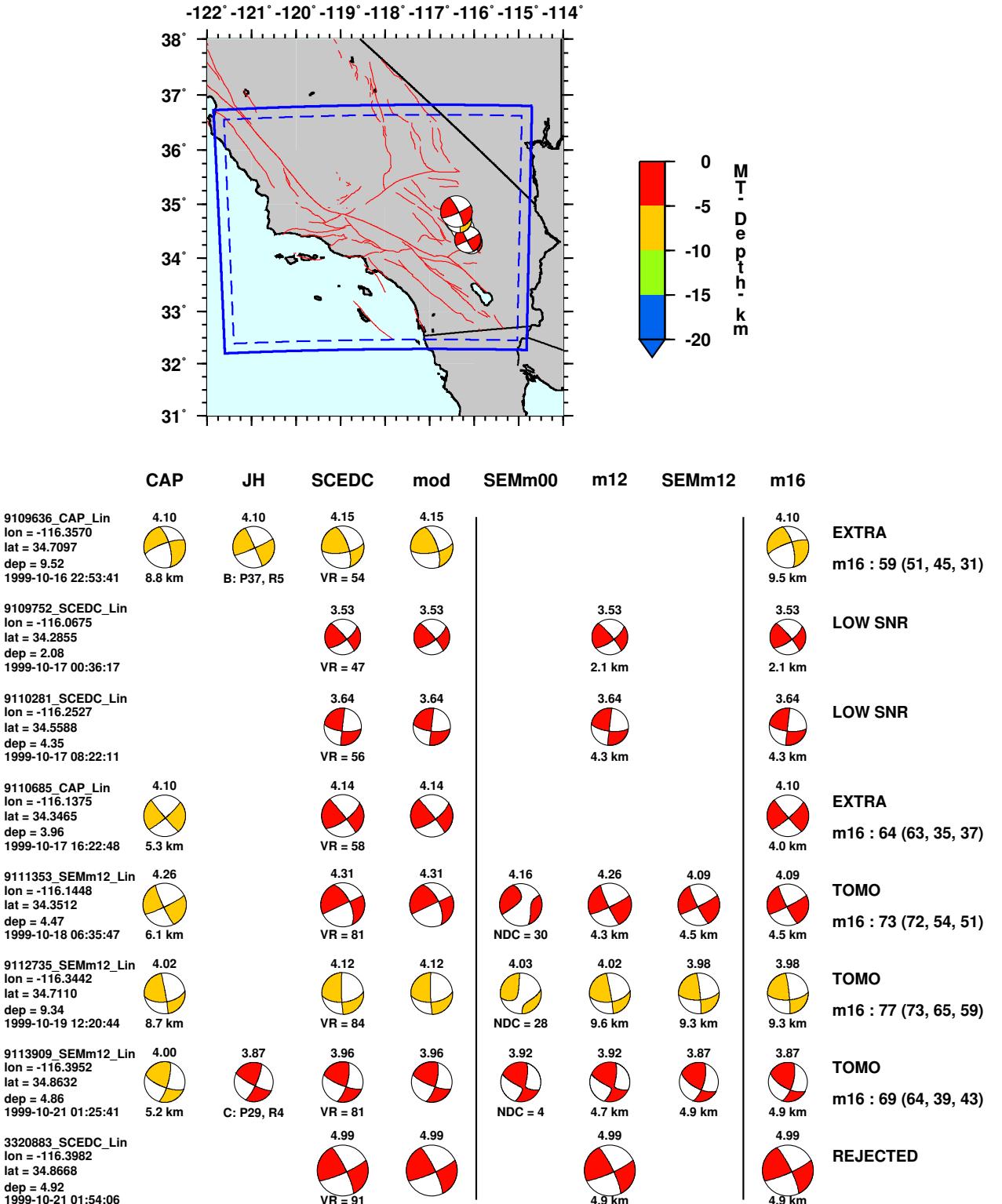


Figure D.15: Source mechanisms considered in the southern California tomography study (113 through 120 out of 294).

294 events in southern California (121 to 128)

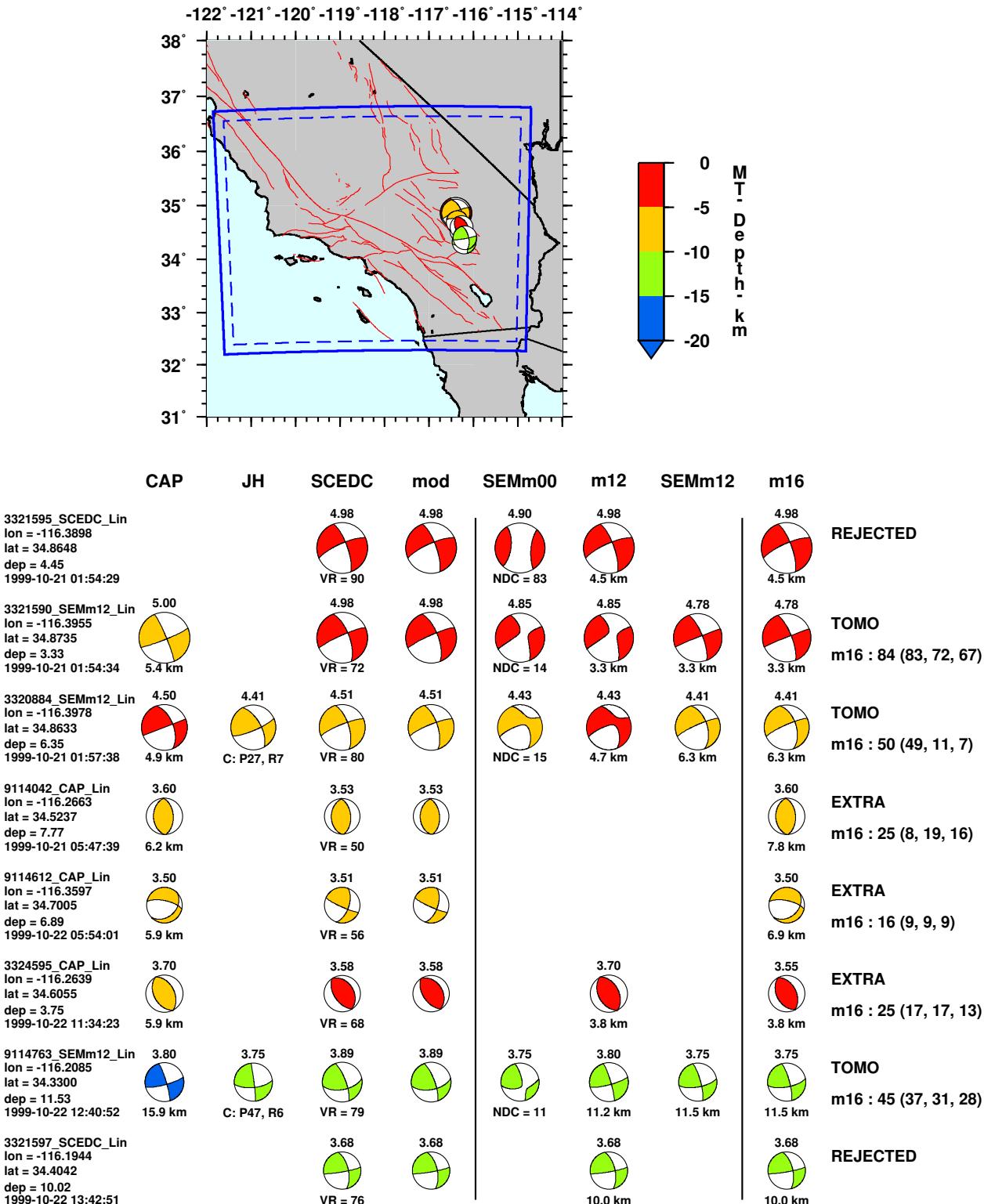


Figure D.16: Source mechanisms considered in the southern California tomography study (121 through 128 out of 294).

294 events in southern California (129 to 136)

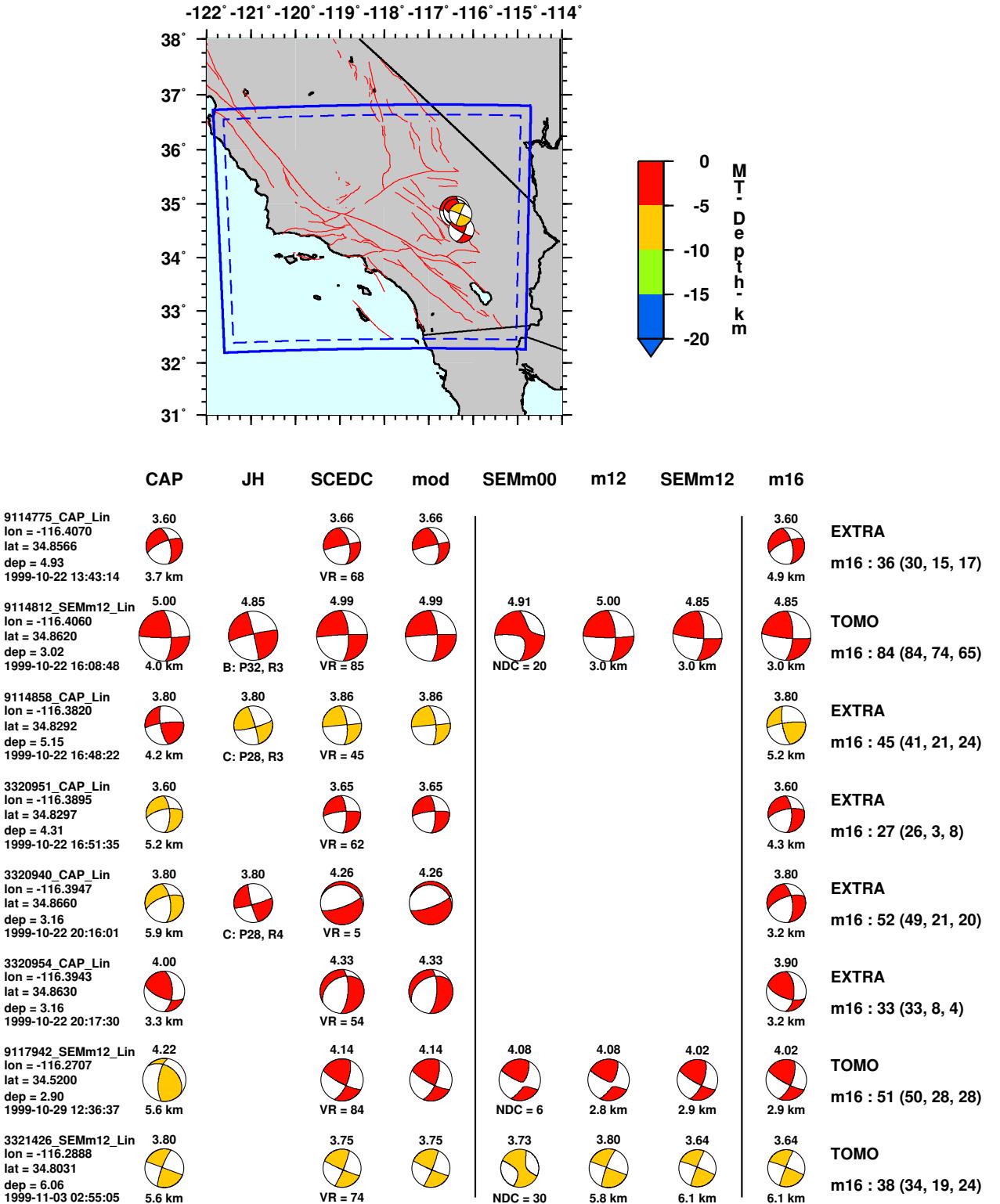


Figure D.17: Source mechanisms considered in the southern California tomography study (129 through 136 out of 294).

294 events in southern California (137 to 144)

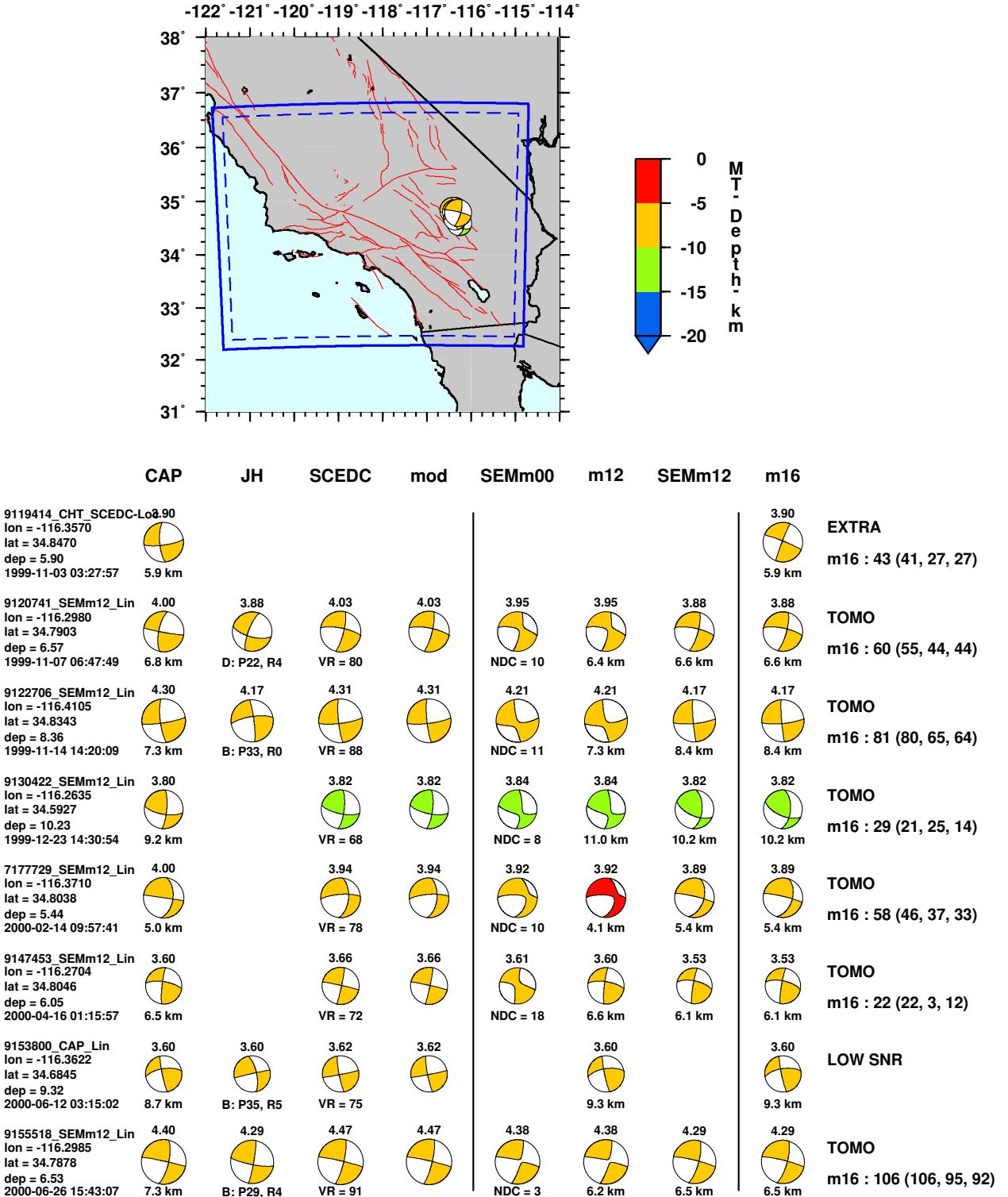
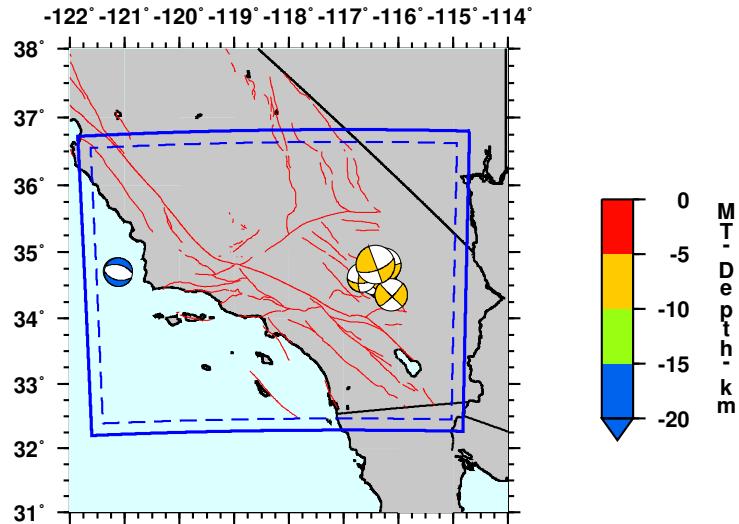


Figure D.18: Source mechanisms considered in the southern California tomography study (137 through 144 out of 294).

294 events in southern California (145 to 152)



	CAP	JH	SCEDC	mod	SEMm00	m12	SEMm12	m16	
9775765_SEMm12_Lin	4.10		4.17	4.17	4.03	4.03	3.93	3.93	TOMO
lon = -116.2952			VR = 87		NDC = 16			4.8 km	m16 : 139 (136, 111, 106)
lat = 34.5177						4.8 km			
dep = 4.83	4.7 km								
2002-04-05 08:02:55									
9805021_CAP_Lin	3.50		3.47	3.47				3.50	EXTRA
lon = -116.4447			VR = 64					9.0 km	m16 : 42 (41, 19, 13)
lat = 34.5660									
dep = 9.00	8.5 km								
2002-07-31 08:31:48									
9854597_SEMm12_Lin	4.50	4.38	4.55	4.55	4.46	4.46	4.38	4.38	TOMO
lon = -116.2650		B: P21, R6	VR = 91		NDC = 24	7.4 km	7.9 km	7.9 km	m16 : 152 (151, 135, 115)
lat = 34.8068									
dep = 7.89	7.6 km								
2002-10-29 14:16:54									
13945908_SEMm12_Lin	4.30		4.27	4.27	4.20	4.20	4.15	4.15	TOMO
lon = -116.1303			VR = 80		NDC = 11	7.7 km	8.1 km	8.1 km	m16 : 137 (133, 117, 108)
lat = 34.3582									
dep = 8.08	8.2 km								
2003-03-11 19:28:17									
9930549_SEMm12_Lin	3.80	3.72	3.83	3.83	3.76	3.76	3.72	3.72	TOMO
lon = -116.6665		B: P79, R16	VR = 87		NDC = 17	8.4 km	9.2 km	9.2 km	m16 : 124 (122, 87, 83)
lat = 34.6172									
dep = 9.16	10.0 km								
2003-07-15 06:15:50									
14408052_CAP_SCEDC-Loc	5.10		5.06					4.95	EXTRA
lon = -116.4190								6.1 km	m16 : 154 (153, 140, 130)
lat = 34.8130									
dep = 6.10									
2008-12-06 04:18:43	6.1 km								
13978600_SEMm00_SCEDC-Loc			3.52	3.52	3.47	3.47	3.47	3.47	BAD SOURCE
lon = -121.1410			VR = 49		NDC = 30	6.0 km		6.0 km	
lat = 34.7150									
dep = 6.00									
2003-07-17 10:08:09									
13978612_SEMm00_Lin		3.68	3.68		3.64	3.64	3.64	3.64	BAD SOURCE
lon = -121.1133			VR = 55		NDC = 9	26.3 km		26.3 km	
lat = 34.7002									
dep = 26.28									
2003-07-17 10:33:23									

Figure D.19: Source mechanisms considered in the southern California tomography study (145 through 152 out of 294).

294 events in southern California (153 to 160)

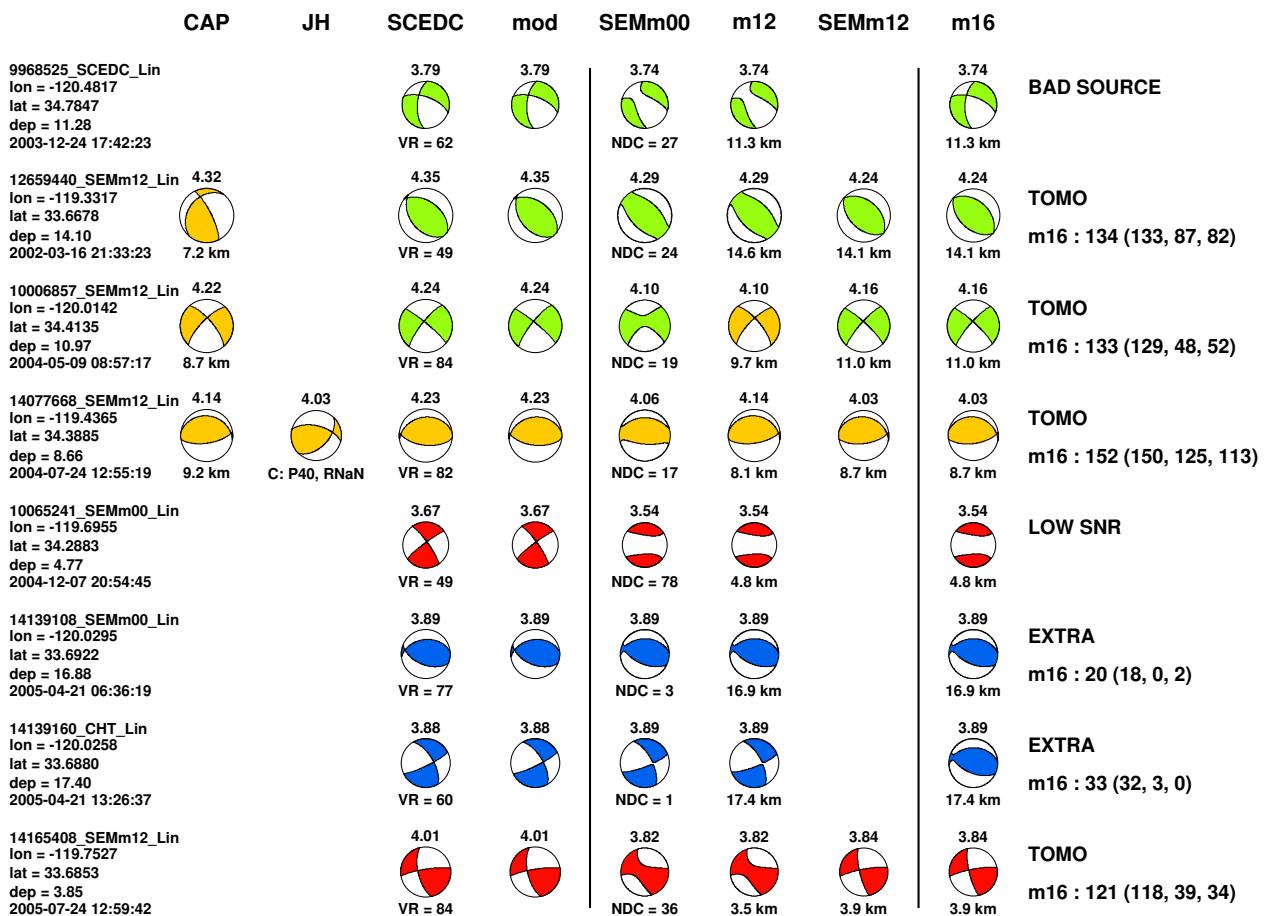
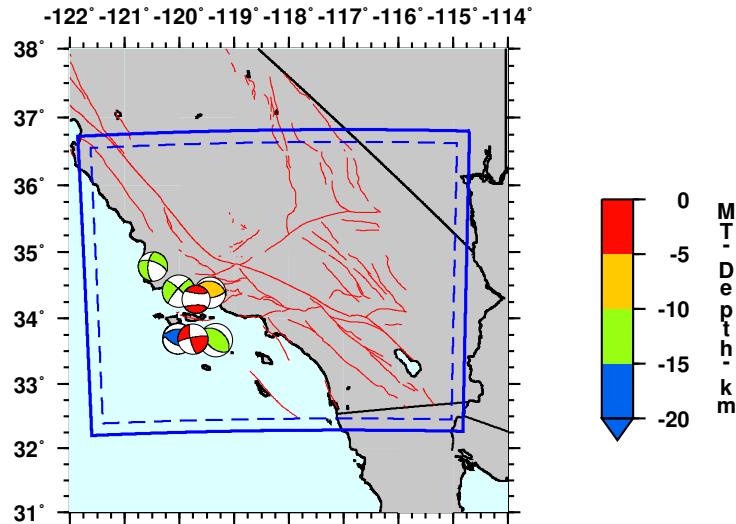


Figure D.20: Source mechanisms considered in the southern California tomography study (153 through 160 out of 294).

294 events in southern California (161 to 168)

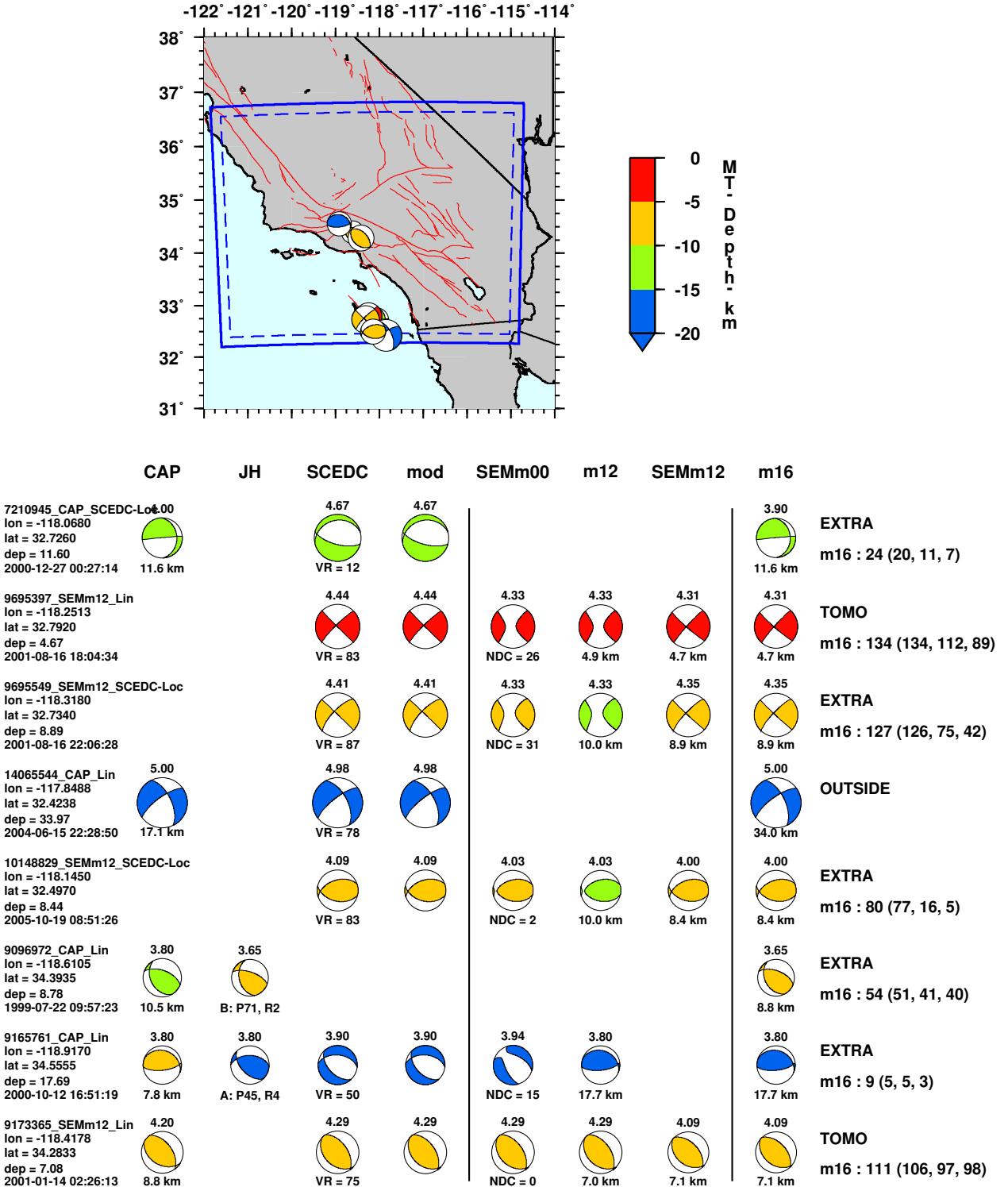
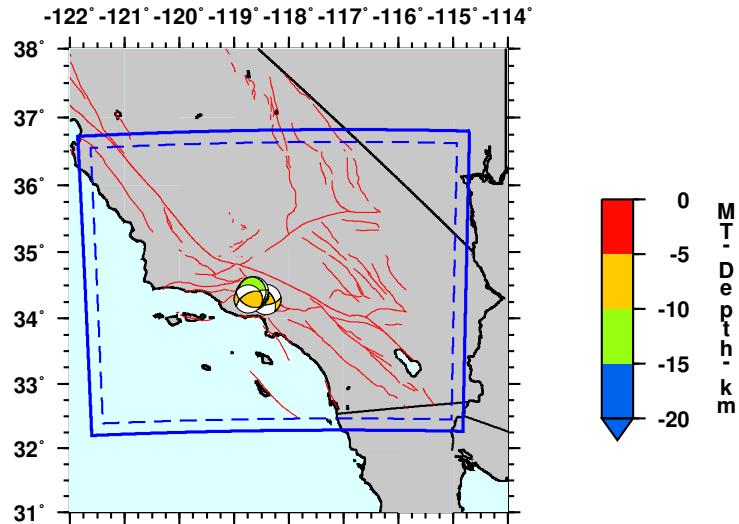


Figure D.21: Source mechanisms considered in the southern California tomography study (161 through 168 out of 294).

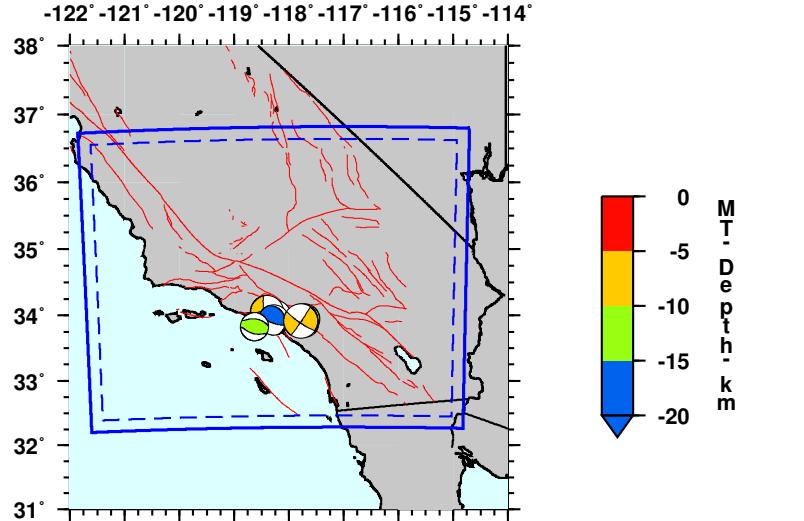
294 events in southern California (169 to 176)



CAP	JH	SCEDC	mod	SEMm00	m12	SEMm12	m16	
9173374_SEMm12_Lin lon = -118.4173 lat = 34.2872 dep = 7.30 2001-01-14 02:50:53		3.98 VR = 68	3.98	3.87 NDC = 30	3.87 7.2 km	3.82 7.3 km	3.82 7.3 km	TOMO m16 : 64 (53, 44, 42)
9753485_SEMm12_Lin lon = -118.6642 lat = 34.3638 dep = 11.42 2002-01-29 05:53:28	4.30 A: P65, R2 13.1 km	4.20 VR = 48	4.57	4.34 NDC = 15	4.30 11.4 km	4.20 11.4 km	4.20 11.4 km	TOMO m16 : 135 (132, 122, 119)
9753489_SEMm12_Lin lon = -118.6642 lat = 34.3670 dep = 11.10 2002-01-29 06:00:39		3.79 A: P71, R8 VR = 75	3.93	3.93	3.81 NDC = 32	3.81 11.2 km	3.79 11.1 km	3.79 11.1 km
9753497_SEMm12_Lin lon = -118.6645 lat = 34.3655 dep = 11.52 2002-01-29 06:08:01	3.90 A: P70, R12 11.6 km	3.73 VR = 43	3.85	3.85	3.75 NDC = 40	3.90 11.5 km	3.73 11.5 km	TOMO m16 : 76 (72, 42, 38)
9753949_SEMm12_Lin lon = -118.6669 lat = 34.3631 dep = 10.33 2002-01-29 20:23:06	3.80 A: P57, R7 10.2 km	3.63 VR = 40	3.85	3.85	3.71 NDC = 1	3.71 10.6 km	3.63 10.3 km	TOMO m16 : 86 (81, 49, 45)
9755013_SEMm12_Lin lon = -118.6670 lat = 34.3647 dep = 10.90 2002-01-30 18:47:57		3.58 B: P61, R6 VR = 51	3.75	3.75	3.58 NDC = 25	3.75 10.7 km	3.58 10.9 km	3.58 10.9 km
9941081_SEMm12_Lin lon = -118.6509 lat = 34.4034 dep = 13.64 2003-08-27 06:02:22	3.90 C: P99, R5 15.8 km	3.80 VR = 61	3.95	3.95	3.81 NDC = 13	3.81 13.6 km	3.80 13.6 km	TOMO m16 : 138 (136, 99, 98)
14000376_CAP_Lin lon = -118.7402 lat = 34.2910 dep = 8.60 2003-10-29 23:44:48	3.60 VR = 20 9.2 km		3.55	3.55			3.60 8.6 km	EXTRA m16 : 61 (56, 28, 28)

Figure D.22: Source mechanisms considered in the southern California tomography study (169 through 176 out of 294).

294 events in southern California (177 to 184)



	CAP	JH	SCEDC	mod	SEMm00	m12	SEMm12	m16
9038699_CAP_Lin lon = -117.7178 lat = 33.9462 dep = 12.98 1998-01-05 18:14:06	3.90 9.9 km	3.90 B: P98, R14						3.90 EXTRA m16 : 30 (28, 22, 23) 13.0 km
9093975_CAP_Lin lon = -118.2253 lat = 34.0097 dep = 6.29 1999-06-29 12:55:00	3.70 6.1 km	3.55 B: P46, R7						3.55 EXTRA m16 : 52 (45, 45, 40) 6.3 km
9644101_SEMm00_Lin lon = -117.7091 lat = 33.8725 dep = 2.46 2001-04-13 11:50:12	3.45 A: P71, R15	3.58 VR = 72	3.58 NDC = 8	3.45 2.5 km	3.45 1.6 km	3.59 2.5 km	3.45 TOMO m16 : 66 (55, 43, 40)	
9703873_SEMm12_Lin lon = -118.3968 lat = 34.0527 dep = 6.37 2001-09-09 23:59:17	4.21 B: P94, R11	4.29 VR = 89	4.29 NDC = 3	4.26 7.8 km	4.26 6.4 km	4.21 6.4 km	4.21 TOMO m16 : 124 (119, 107, 106)	
9716853_SEMm12_Lin lon = -118.2795 lat = 33.9297 dep = 19.12 2001-10-28 16:27:45	3.80 15.8 km A: P86, R11	3.86 VR = 50	3.89 NDC = 22	3.85 19.2 km	3.85 19.1 km	3.86 19.1 km	3.86 TOMO m16 : 80 (66, 34, 45)	
9735129_SEMm12_Lin lon = -117.7483 lat = 33.9552 dep = 12.45 2001-12-14 12:01:35	3.70 8.3 km B: P70, R25	3.74 VR = 72	3.89 NDC = 22	3.73 12.4 km	3.73 12.5 km	3.74 12.5 km	3.74 TOMO m16 : 54 (45, 30, 33) 12.5 km	
9818433_SEMm12_Lin lon = -117.7840 lat = 33.9133 dep = 8.59 2002-09-03 07:08:51	4.30 7.6 km B: P118, R23	4.35 VR = 90	4.38 NDC = 8	4.33 9.4 km	4.33 8.6 km	4.35 8.6 km	4.35 TOMO m16 : 145 (141, 135, 124)	
10094253_SEMm00_Lin lon = -118.6268 lat = 33.8280 dep = 11.28 2005-04-24 21:44:28		3.63 VR = 51	3.63 NDC = 14	3.58 11.3 km	3.58 11.3 km	3.58 11.3 km	3.58 EXTRA m16 : 20 (19, 9, 7)	

Figure D.23: Source mechanisms considered in the southern California tomography study (177 through 184 out of 294).

294 events in southern California (185 to 192)

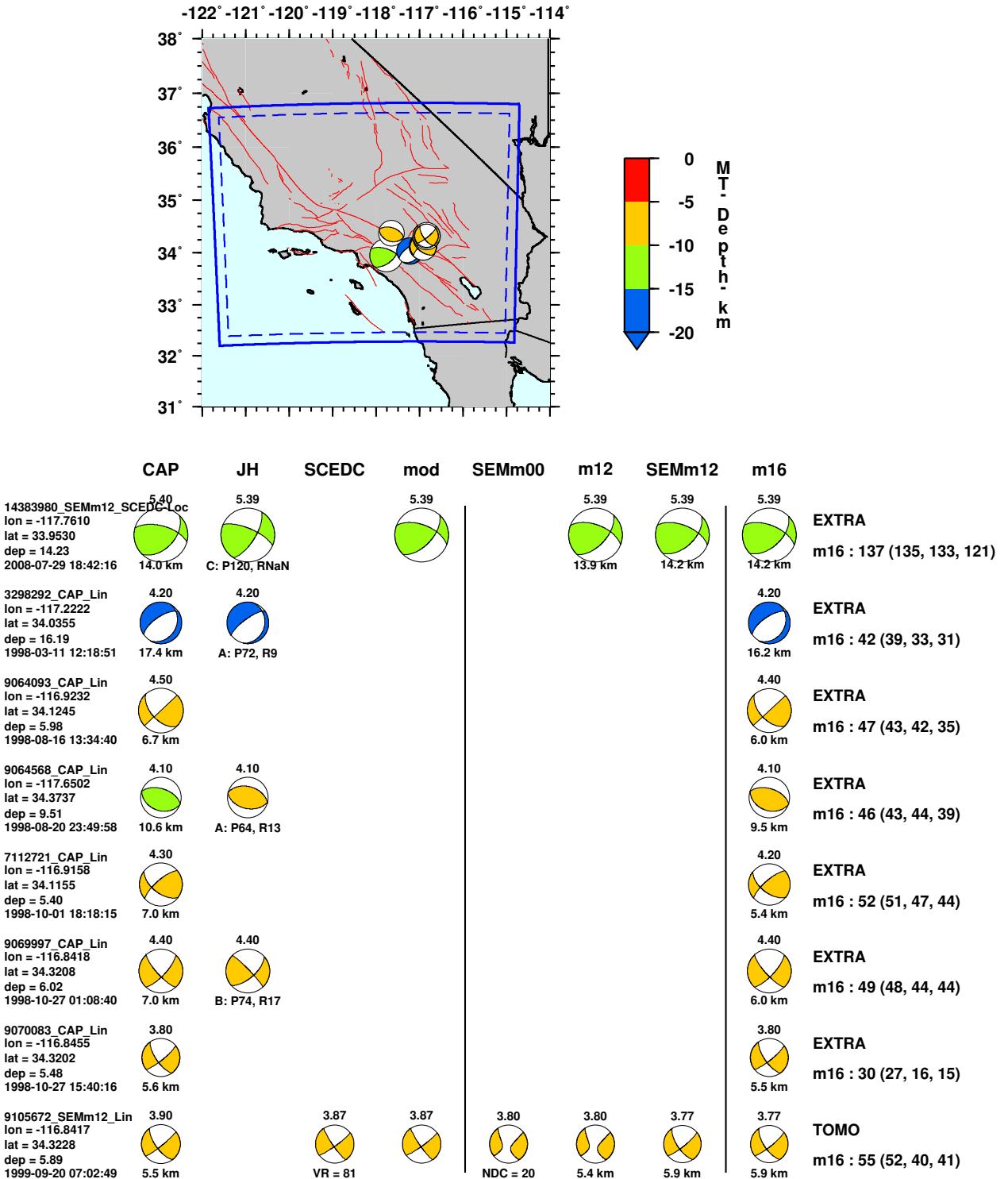
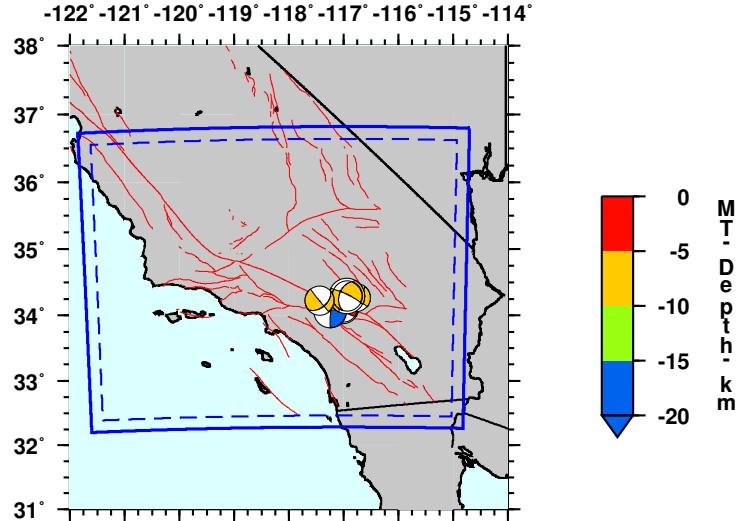


Figure D.24: Source mechanisms considered in the southern California tomography study (185 through 192 out of 294).

294 events in southern California (193 to 200)



	CAP	JH	SCEDC	mod	SEMm00	m12	SEMm12	m16	
9128775_SEMm12_Lin lon = -117.0072 lat = 34.1048 dep = 4.71 1999-12-13 13:20:16	4.00 5.2 km 	3.89 B: P75, R14 	4.03 VR = 72 	4.03 	3.91 NDC = 35 	4.00 4.2 km 	3.89 4.7 km 	3.89 4.7 km 	TOMO m16 : 66 (63, 44, 41)
9132433_JH_Lin lon = -117.0028 lat = 34.1040 dep = 4.63 2000-01-03 21:59:31		3.52 A: P69, R10 	3.55 VR = 53 	3.55 			3.55 4.6 km 	3.52 4.6 km 	EXTRA m16 : 20 (16, 6, 6)
9140050_SEMm12_Lin lon = -117.2432 lat = 34.0588 dep = 16.34 2000-02-21 13:49:43	4.20 17.7 km 	4.10 A: P72, R21 	4.22 VR = 83 	4.22 	4.10 NDC = 12 	4.10 16.5 km 	4.10 16.3 km 	4.10 16.3 km 	TOMO m16 : 72 (67, 57, 56)
9151375_CAP_Lin lon = -116.8683 lat = 34.2906 dep = 6.92 2000-05-21 06:27:37	3.50 7.7 km 	3.50 B: P77, R13 	3.47 VR = 48 	3.47 				3.50 6.9 km 	LOW SNR
9169867_SEMm12_Lin lon = -116.7722 lat = 34.2673 dep = 5.82 2000-12-02 08:28:07	3.80 5.9 km 		3.89 VR = 44 	3.89 	3.73 NDC = 12 	3.80 5.7 km 	3.66 5.8 km 	3.66 5.8 km 	TOMO m16 : 40 (35, 16, 23)
9627721_SEMm12_Lin lon = -116.9397 lat = 34.2910 dep = 8.28 2001-02-10 21:05:05	4.70 8.4 km 		4.66 VR = 72 	4.66 	4.60 NDC = 4 	4.60 7.6 km 	4.56 8.3 km 	4.56 8.3 km 	TOMO m16 : 117 (115, 111, 105)
9627953_CAP_Lin lon = -116.9370 lat = 34.2930 dep = 7.90 2001-02-11 00:39:15	3.80 7.8 km 		4.60 VR = 24 	4.60 				3.80 7.9 km 	EXTRA m16 : 36 (34, 19, 17)
9652545_CAP_Lin lon = -117.4415 lat = 34.2269 dep = 8.64 2001-05-14 17:13:30	3.70 7.1 km 		4.57 VR = 6 	4.57 				3.70 8.6 km 	EXTRA m16 : 71 (62, 54, 51)

Figure D.25: Source mechanisms considered in the southern California tomography study (193 through 200 out of 294).

294 events in southern California (201 to 208)

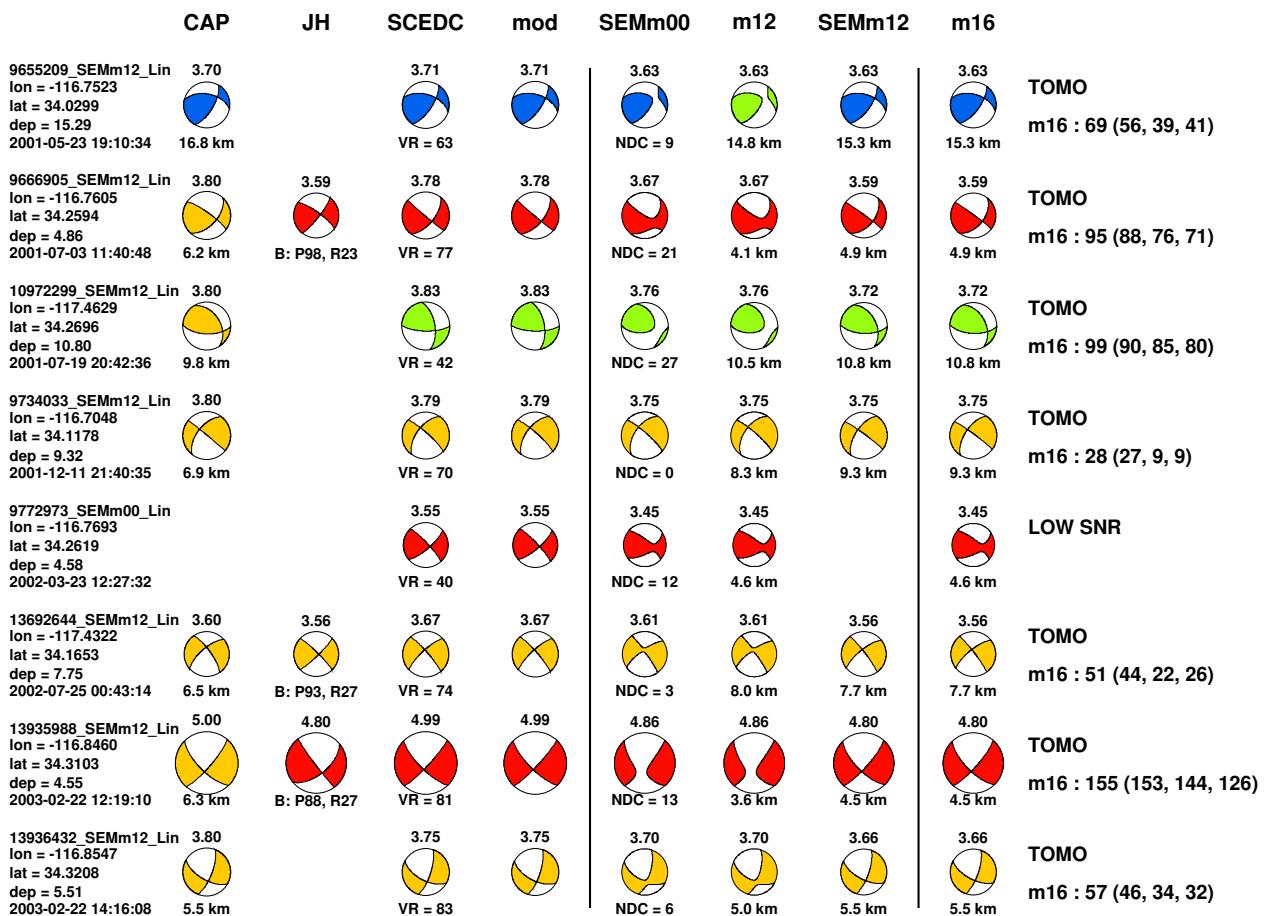
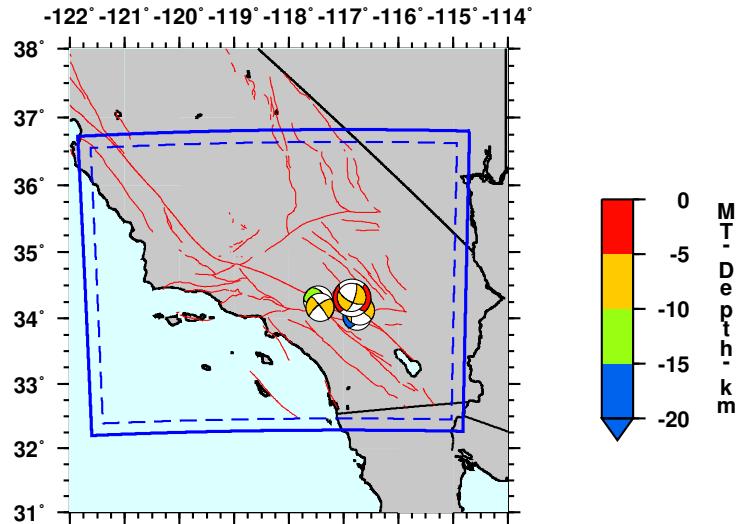


Figure D.26: Source mechanisms considered in the southern California tomography study (201 through 208 out of 294).

294 events in southern California (209 to 216)

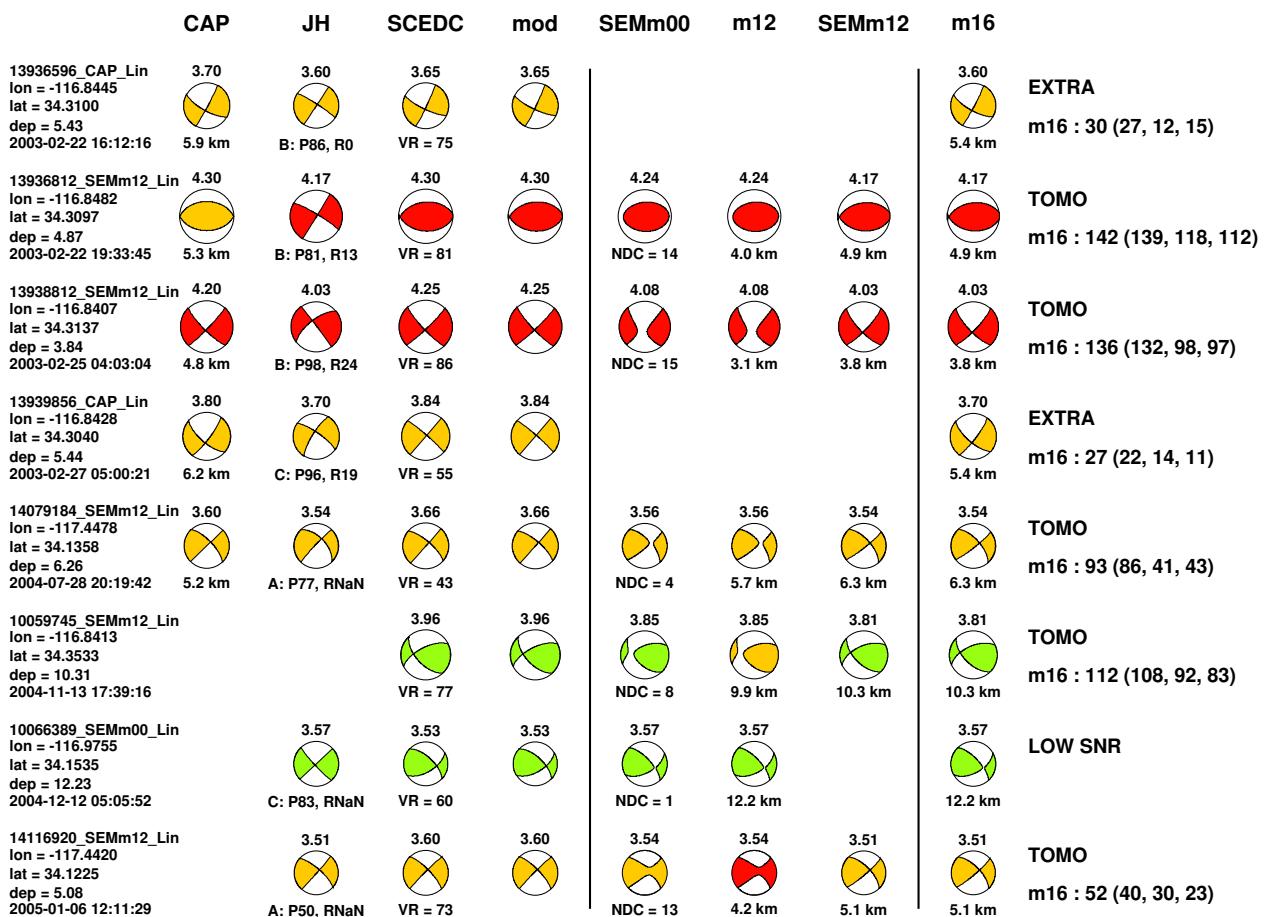
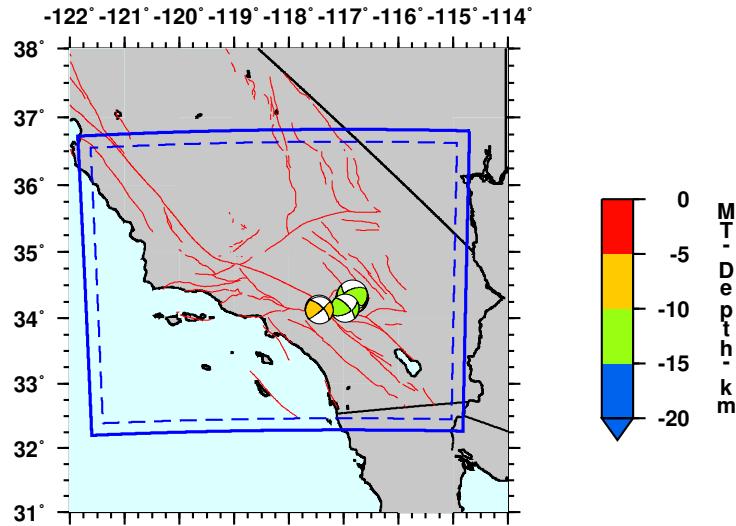


Figure D.27: Source mechanisms considered in the southern California tomography study (209 through 216 out of 294).

294 events in southern California (217 to 224)

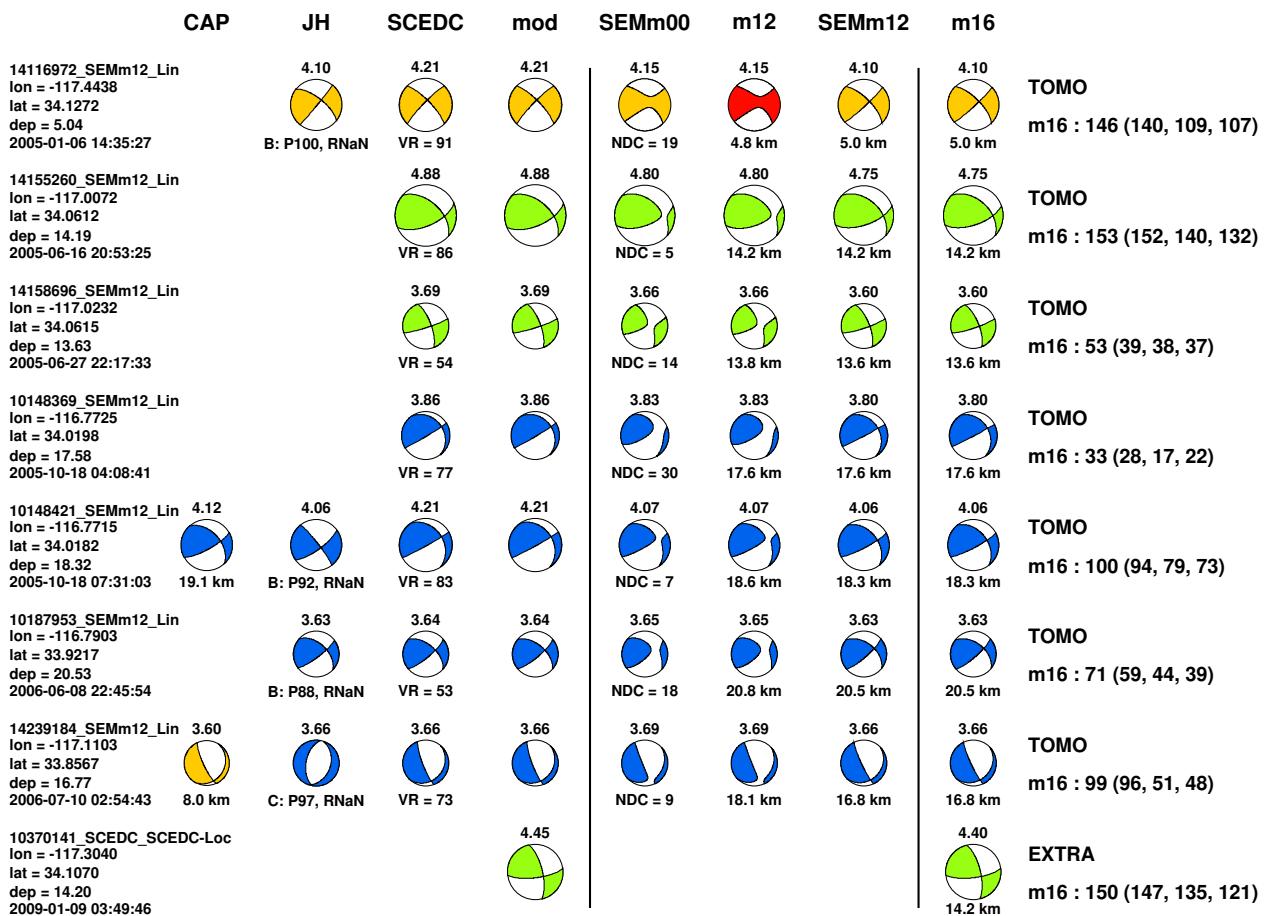
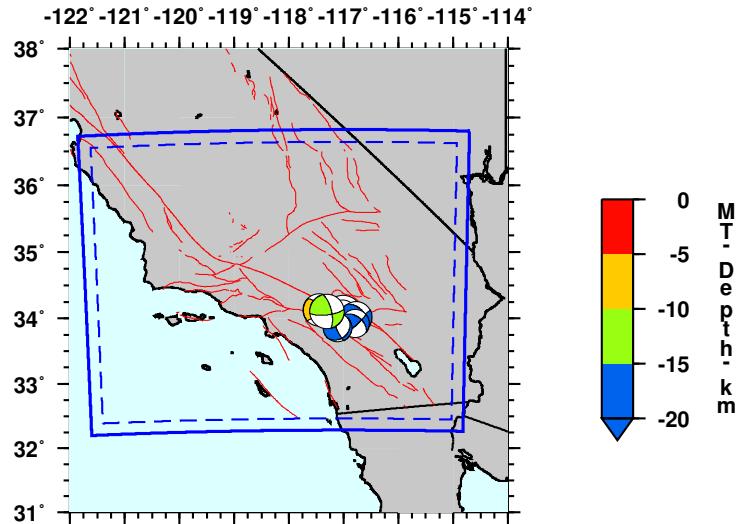


Figure D.28: Source mechanisms considered in the southern California tomography study (217 through 224 out of 294).

294 events in southern California (225 to 232)

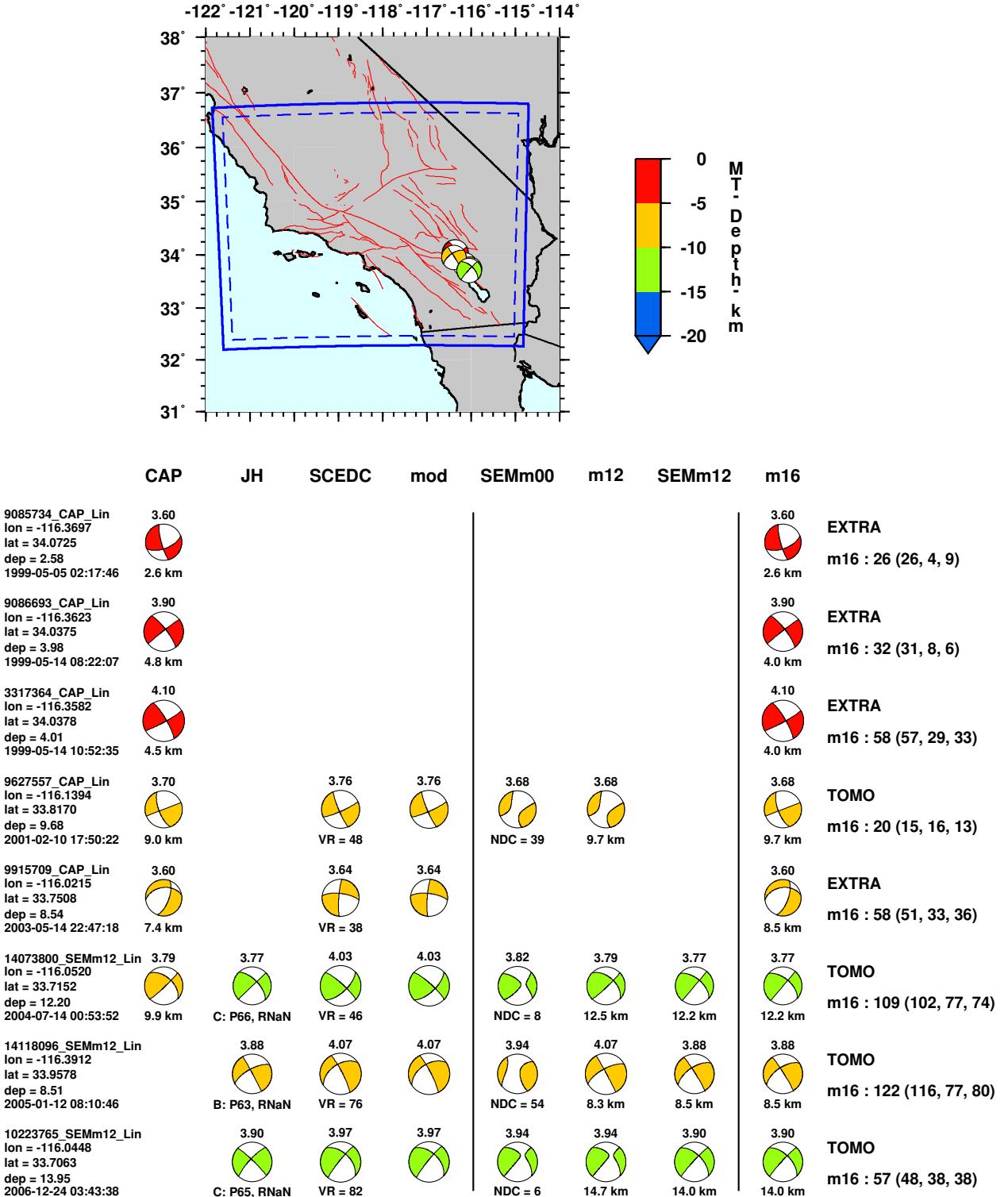


Figure D.29: Source mechanisms considered in the southern California tomography study (225 through 232 out of 294).

294 events in southern California (233 to 240)

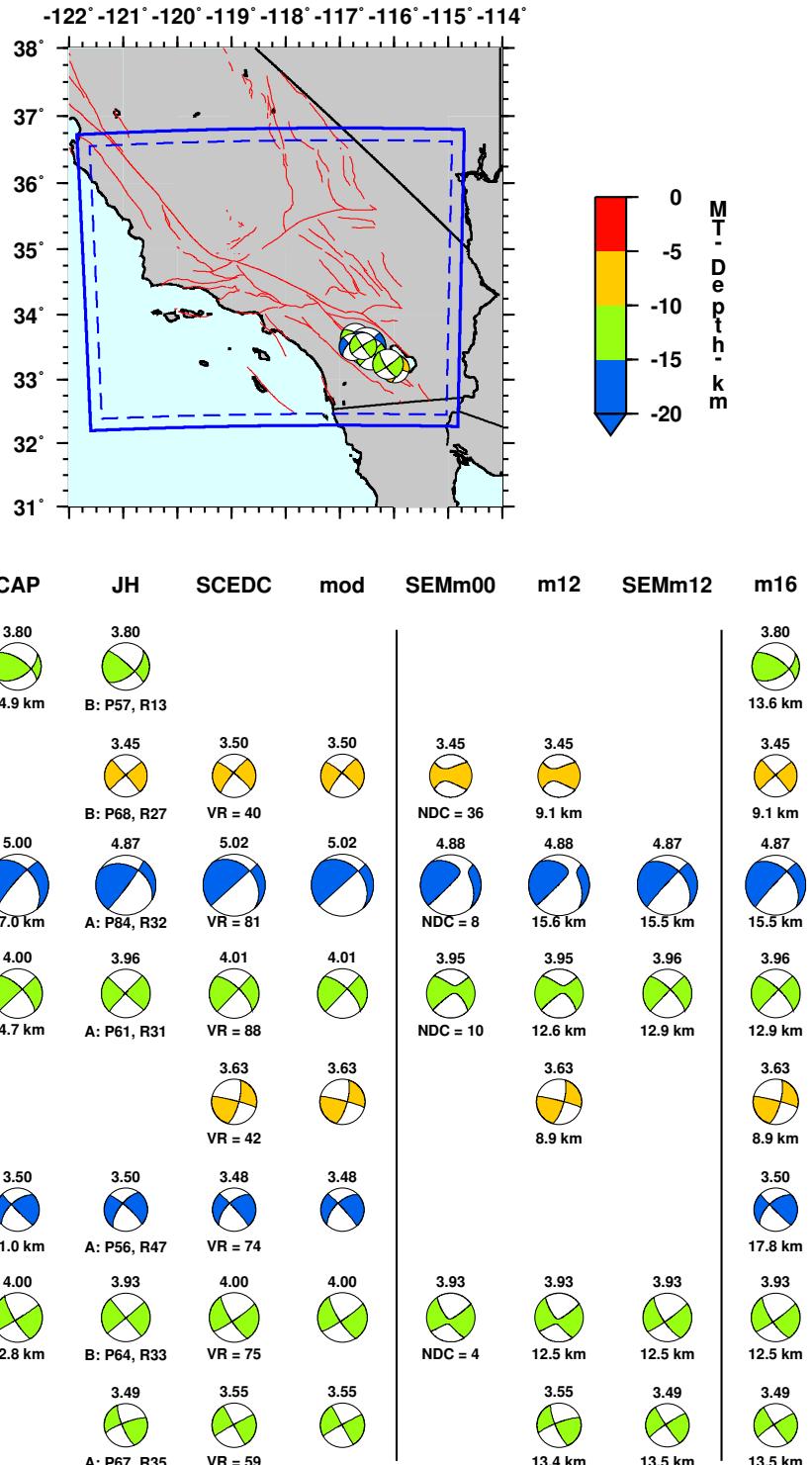
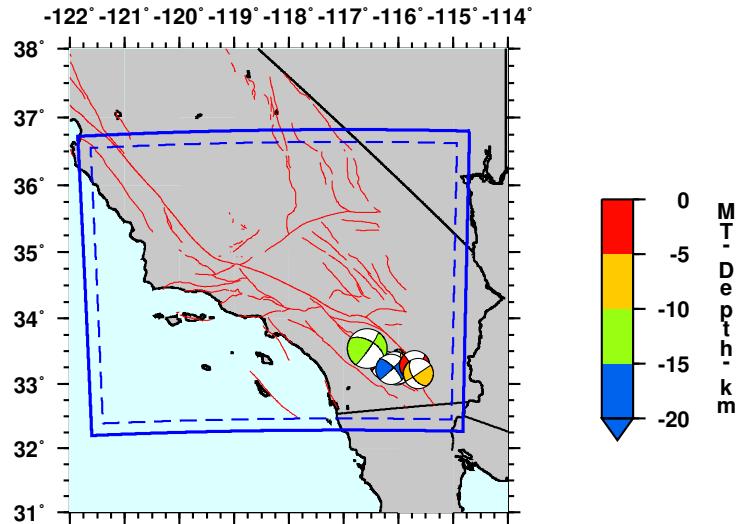


Figure D.30: Source mechanisms considered in the southern California tomography study (233 through 240 out of 294).

294 events in southern California (241 to 248)



CAP	JH	SCEDC	mod	SEMm00	m12	SEMm12	m16	
14133048_SEMm12_Lin lon = -116.2515 lat = 33.2884 dep = 4.74 2005-03-22 08:55:05	3.64 B: P47, RNan	3.71 VR = 43	3.71	3.70 NDC = 40	3.71 4.4 km	3.64 4.7 km	3.64 4.7 km	TOMO m16 : 26 (22, 5, 3)
14151344_SEMm12_Lin lon = -116.5675 lat = 33.5380 dep = 13.91 2005-06-12 15:41:46	5.08 B: P90, RNan	5.19 VR = 89	5.19	5.08 NDC = 3	5.08 14.1 km	5.08 13.9 km	5.08 13.9 km	TOMO m16 : 144 (142, 132, 126)
14183744_SEMm12_Lin lon = -116.0260 lat = 33.1787 dep = 5.47 2005-09-11 06:07:27	3.39 B: P57, RNan	3.50 VR = 64	3.50	3.42 NDC = 22	3.42 6.1 km	3.39 5.5 km	3.39 5.5 km	TOMO m16 : 39 (34, 21, 21)
14236768_SEMm12_Lin lon = -116.0220 lat = 33.2450 dep = 3.84 2006-06-30 00:28:06	4.12 A: P61, RNan	4.19 VR = 83	4.19	4.18 NDC = 4	4.19 5.0 km	4.12 3.8 km	4.12 3.8 km	TOMO m16 : 152 (152, 120, 100)
14255632_SEMm12_Lin lon = -116.0632 lat = 33.2663 dep = 7.79 2006-10-09 20:26:50	3.75 B: P60, RNan	3.72 VR = 71	3.72	3.76 NDC = 7	3.76 9.7 km	3.75 7.8 km	3.75 7.8 km	TOMO m16 : 57 (52, 19, 19)
10230869_SEMm12_Lin lon = -116.1357 lat = 33.2220 dep = 20.99 2007-02-09 03:33:43	3.98 VR = 52	3.98 VR = 52	3.98	3.96 NDC = 8	3.98 22.2 km	3.86 21.0 km	3.86 21.0 km	EXTRA m16 : 83 (80, 39, 19)
9109243_SCEDC_Lin lon = -115.7045 lat = 33.2806 dep = 3.90 1999-10-16 17:48:31	3.84 VR = 45	3.84 VR = 45	3.84	3.84 3.9 km	3.84 3.9 km	3.84 3.9 km	3.84 3.9 km	LOW SNR
9148510_CAP_Lin lon = -115.6349 lat = 33.1579 dep = 6.96 2000-04-25 18:36:07	3.80 6.5 km	3.89 VR = 40	3.89				3.80 7.0 km	EXTRA m16 : 23 (20, 9, 9)

Figure D.31: Source mechanisms considered in the southern California tomography study (241 through 248 out of 294).

294 events in southern California (249 to 256)

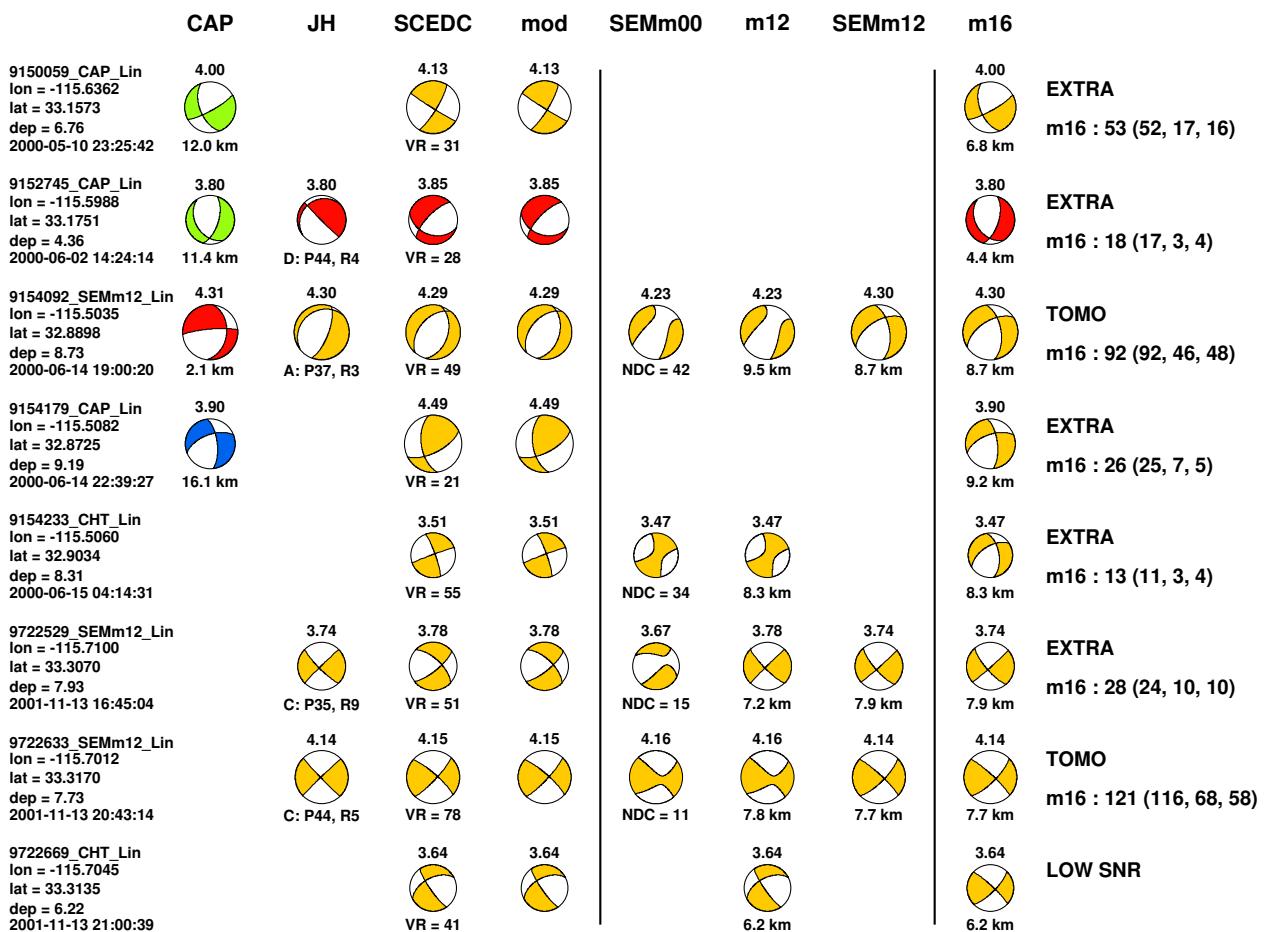
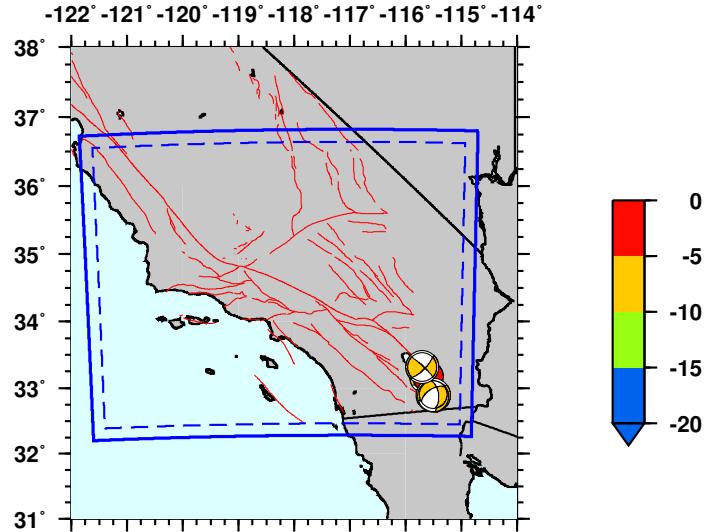
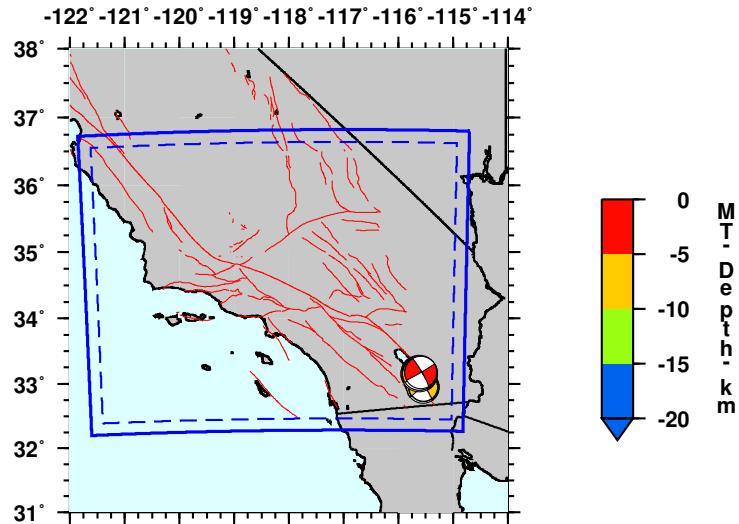


Figure D.32: Source mechanisms considered in the southern California tomography study (249 through 256 out of 294).

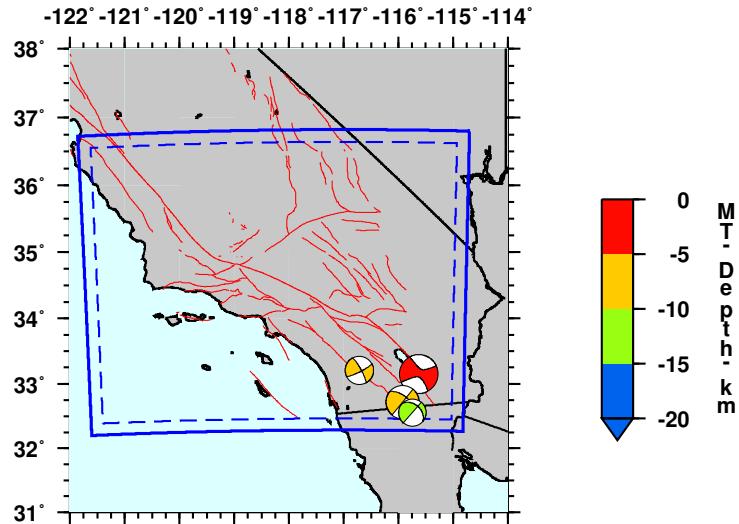
294 events in southern California (257 to 264)



	CAP	JH	SCEDC	mod	SEMm00	m12	SEMm12	m16	
9817605_CHT_Lin lon = -115.6173 lat = 33.0366 dep = 7.47 2002-08-31 16:24:33	3.80 	3.78 	3.78 	3.78 				3.80 	EXTRA m16 : 112 (108, 39, 27) 7.5 km
13966396_SEMm12_Lin lon = -115.5538 lat = 32.9475 dep = 8.72 2003-05-24 02:04:28		4.16 	4.16 	4.16 	4.16 	4.16 	4.14 	4.14 	TOMO m16 : 133 (129, 66, 46) 8.7 km
13966672_CHT_Lin lon = -115.5409 lat = 32.9455 dep = 9.30 2003-05-24 06:51:10		3.86 	3.86 	3.86 	3.80 	3.80 	3.86 	3.80 	EXTRA m16 : 72 (71, 27, 18) 9.3 km
13970876_SEMm12_Lin lon = -115.5472 lat = 32.9443 dep = 8.15 2003-06-12 03:53:07		3.66 	3.72 	3.72 	3.63 	3.63 	3.72 	3.66 	TOMO m16 : 43 (39, 19, 15) 8.1 km
14178184_SEMm12_Salton lon = -115.6207 lat = 33.1544 dep = 4.50 2005-08-31 22:47:45		4.74 	4.74 	4.74 	4.65 	4.65 	4.55 	4.67 	TOMO m16 : 151 (150, 118, 110) 4.5 km
14178188_SEMm12_Salton lon = -115.6098 lat = 33.1639 dep = 1.59 2005-08-31 22:50:24		4.64 	4.64 	4.64 	4.54 	4.54 	4.44 	4.40 	TOMO m16 : 68 (67, 16, 8) 1.6 km
14178212_SEMm12_Salton lon = -115.6157 lat = 33.1548 dep = 5.01 2005-08-31 23:07:16		4.44 	4.44 	4.44 	4.32 	4.32 	4.32 	4.29 	TOMO m16 : 149 (148, 95, 98) 5.0 km
14178236_SEMm12_Salton ³⁴ lon = -115.5924 lat = 33.1748 dep = 3.95 2005-08-31 23:27:32	4.31 	4.31 	4.31 	4.13 	4.13 	4.03 	4.08 	4.08 	TOMO m16 : 149 (148, 109, 94) 3.9 km
				VR = 81 16.1 km		NDC = 97 3.9 km			

Figure D.33: Source mechanisms considered in the southern California tomography study (257 through 264 out of 294).

294 events in southern California (265 to 272)



CAP	JH	SCEDC	mod	SEMm00	m12	SEMm12	m16	
14178248_SEMm12_Salton lon = -115.5969 lat = 33.1712 dep = 5.05 2005-08-31 23:32:11	4.34 C: P45, RNan	4.44 VR = 87	4.44	4.39 NDC = 35	4.39 4.8 km	4.34 5.1 km	4.34 5.1 km	TOMO m16 : 149 (149, 85, 79)
14179288_SEMm12_Salton#02 lon = -115.6168 lat = 33.1538 dep = 4.74 2005-09-01 13:48:25	4.05 12.3 km	4.05 VR = 66	4.05	3.88 NDC = 21	3.95 4.6 km	3.82 4.7 km	3.82 4.7 km	EXTRA m16 : 104 (101, 68, 63)
14179292_SEMm12_Salton#02 lon = -115.6064 lat = 33.1643 dep = 2.63 2005-09-01 13:50:20	4.71 11.1 km	4.63 VR = 80	4.63	4.41 NDC = 64	4.53 2.8 km	4.41 2.6 km	4.41 2.6 km	TOMO m16 : 154 (154, 111, 103)
14179736_SEMm12_Salton lon = -115.6295 lat = 33.1479 dep = 4.90 2005-09-02 01:27:20	5.11 VR = 87	5.11	5.11	4.97 NDC = 28	4.87 4.8 km	4.97 4.9 km	4.97 4.9 km	TOMO m16 : 162 (161, 125, 113)
9075784_CAP_Lin lon = -115.9196 lat = 32.7260 dep = 6.25 1999-01-13 10:02:05	3.80 8.8 km						3.80 6.2 km	EXTRA m16 : 27 (24, 18, 19)
9075803_CAP_Lin lon = -115.9248 lat = 32.7190 dep = 8.00 1999-01-13 13:20:56	4.20 8.2 km						4.20 8.0 km	EXTRA m16 : 46 (45, 35, 34)
12456160_SEMm12_Lin lon = -115.7451 lat = 32.5553 dep = 10.00 2002-02-21 18:27:24		3.68 VR = 44	3.68	3.64 NDC = 0	3.64 10.0 km	3.50 10.0 km	3.50 10.0 km	TOMO m16 : 27 (26, 6, 7)
9774569_SEMm12_Lin lon = -116.7117 lat = 33.2065 dep = 9.82 2002-03-30 13:50:51	3.70 10.3 km	3.71 VR = 77	3.71	3.65 NDC = 3	3.65 9.3 km	3.62 9.8 km	3.62 9.8 km	TOMO m16 : 56 (53, 28, 28)

Figure D.34: Source mechanisms considered in the southern California tomography study (265 through 272 out of 294).

294 events in southern California (273 to 280)

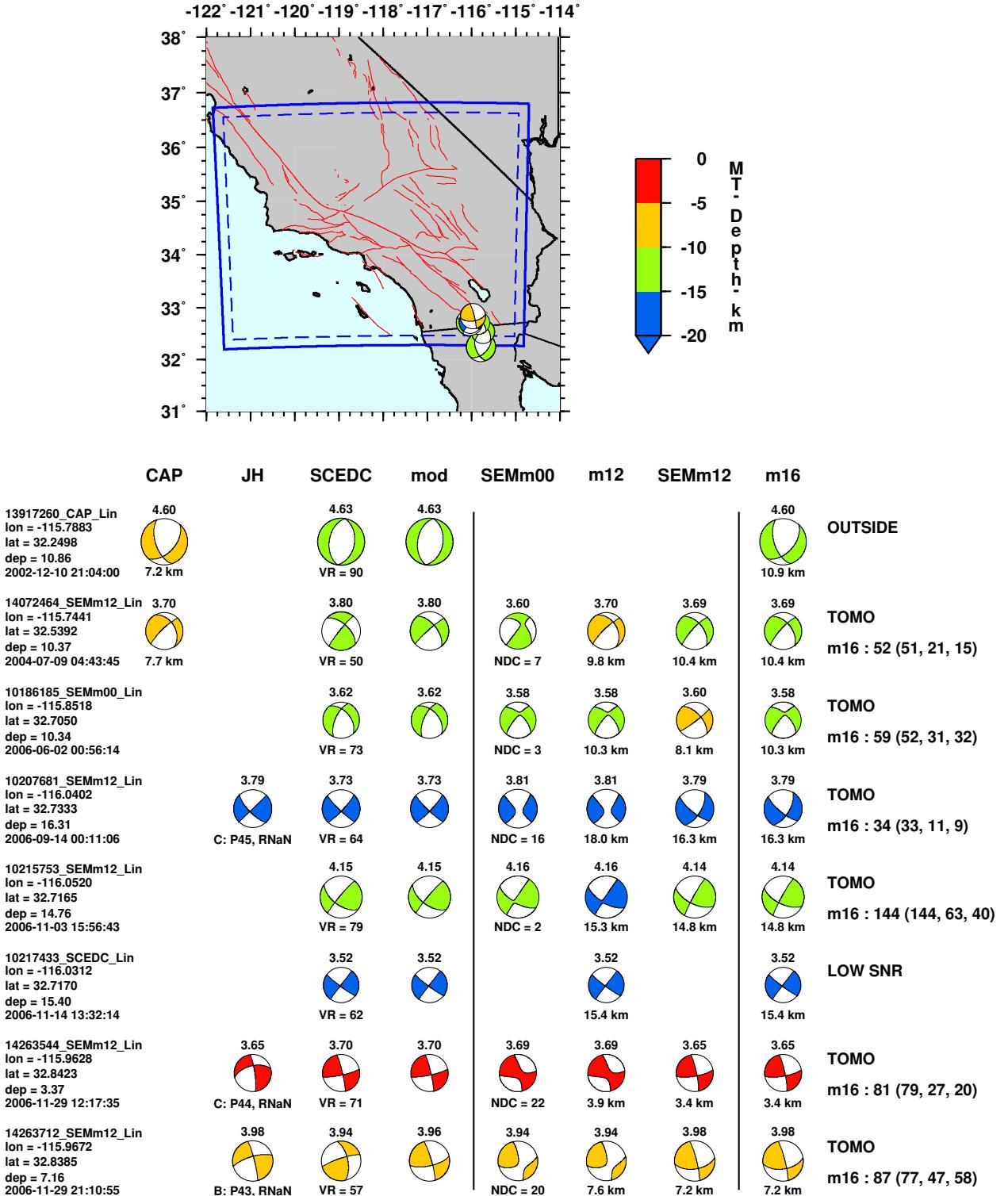
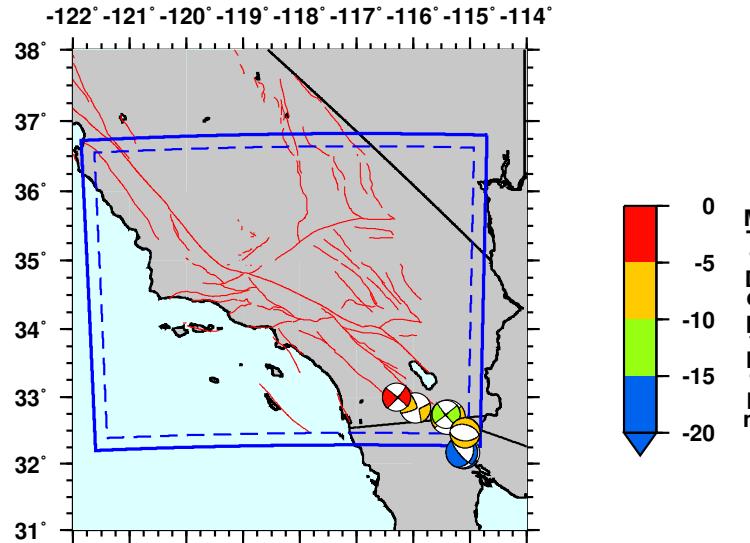


Figure D.35: Source mechanisms considered in the southern California tomography study (273 through 280 out of 294).

294 events in southern California (281 to 288)



CAP	JH	SCEDC	mod	SEMm00	m12	SEMm12	m16	
14263716_SEMm00_Lin lon = -115.9672 lat = 32.8377 dep = 3.43 2006-11-29 21:12:52		3.63 VR = 40	3.63	3.59 NDC = 3	3.59 3.4 km		3.59 3.4 km	LOW SNR
14263768_SEMm00_Lin lon = -115.9632 lat = 32.8318 dep = 5.82 2006-11-29 22:15:39	3.75 B: P37, RNaN	3.73 VR = 59	3.73	3.75 NDC = 4	3.75 5.8 km	3.68 4.2 km	3.75 5.8 km	TOMO m16 : 59 (57, 28, 14)
10226877_SEMm12_Lin lon = -116.2947 lat = 32.9945 dep = 4.03 2007-01-17 16:07:47	3.48 B: P48, RNaN	3.60 VR = 46	3.60	3.56 NDC = 35	3.56 3.6 km	3.48 4.0 km	3.48 4.0 km	TOMO m16 : 46 (41, 23, 19)
9146641_SEMm12_Lin lon = -115.3868 lat = 32.7020 dep = 9.44 2000-04-09 10:48:09	4.21 D: P28, R4	4.26 VR = 86	4.26	4.24 NDC = 37	4.26 10.2 km	4.21 9.4 km	4.21 9.4 km	TOMO m16 : 77 (77, 40, 29)
9158503_CAP_Lin lon = -115.1060 lat = 32.1622 dep = 22.36 2000-07-26 03:01:46	3.90 14.3 km	3.97 VR = 70	3.97				3.90 22.4 km	OUTSIDE
9164821_CAP_Lin lon = -115.1458 lat = 32.1727 dep = 24.56 2000-10-01 04:46:19	3.90 11.7 km	3.66 VR = 68	3.66				3.90 24.6 km	OUTSIDE
9660449_CHT_Lin lon = -115.4224 lat = 32.7416 dep = 10.20 2001-06-13 07:44:14		3.72 VR = 64	3.72		3.72 10.2 km		3.47 10.2 km	EXTRA m16 : 13 (13, 0, 0)
9744905_SCEDC_Lin lon = -115.0875 lat = 32.4633 dep = 9.99 2002-01-06 01:25:11		3.71 VR = 43	3.71		3.71 10.0 km		3.71 10.0 km	REJECTED

Figure D.36: Source mechanisms considered in the southern California tomography study (281 through 288 out of 294).

294 events in southern California (289 to 294)

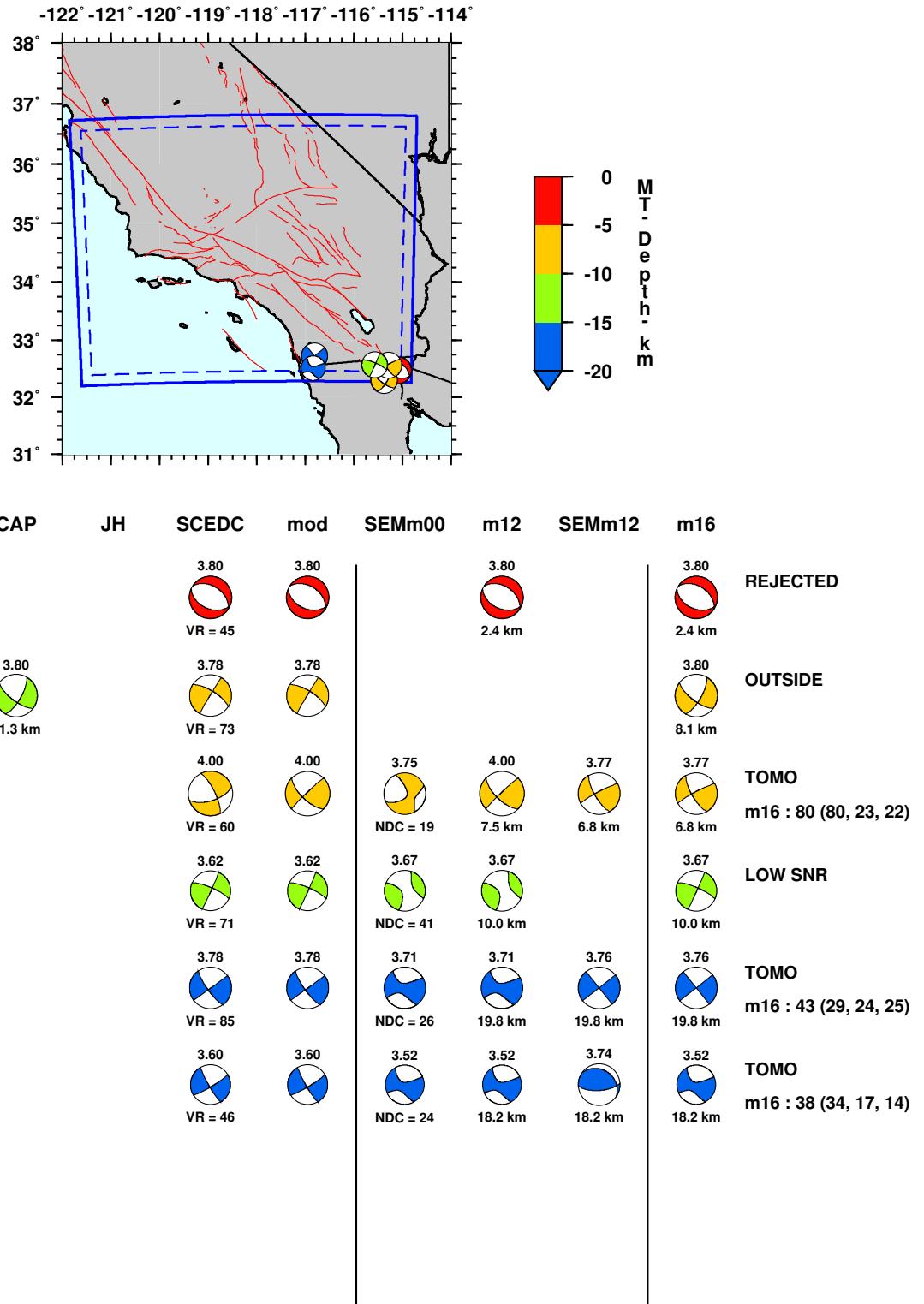


Figure D.37: Source mechanisms considered in the southern California tomography study (289 through 294 out of 294).